DOCUMENT RESUME

ED 263 357 CE 042 848

TITLE Special Project: Data Base for Millmen and Cabinetmaker Curriculum. Final Report for Phase I.
INSTITUTION Oregon Alliance for Program Improvement, Corvallis.
SPONS AGENCY Oregon State Dept. of Education, Salem. Div. of Vocational Education.
PUB DATE 84
NOTE 196p.
PUB TYPE Reports - Descriptive (141) -- Guides - Non-Classroom Use (055)

EDRS PRICE MF01/PC08 Plus Postage.
DESCRIPTORS *Apprenticeships; *Cabinetmaking; Carpentry; *Course Content; *Curriculum Development; Industrial Arts; Learning Activities; Occupational Information; Postsecondary Education; *State Curriculum Guides; *Task Analysis
IDENTIFIERS *Oregon

ABSTRACT

This project was conducted to develop an apprentice-related training curriculum for cabinetmakers and millmen in Oregon. During the project, a task inventory for the occupation of cabinetmaker/millman was produced, the components of a complete four-year related training program were identified, a nationwide search for existing instructional material related to the occupations was conducted, the usability of the available materials was assessed, and recommendations for what could be used in a curriculum and what had to be created were made. A steering committee was used to provide direction and evaluation, and the task inventory produced was verified by industry personnel in Oregon. A course outline was developed for the total program, broken down into segments of instruction, and approved by the steering committee; a resource was provided for each instructional item on the course outline. A final report was produced which provides an instructional base for supporting a complete related training program. Extensive appendixes to the report include the following: request and proof of need for curriculum, background material on task inventory, survey sample sheet, survey results, employer interview, states' outlines, contacts and addresses, and materials used and/or produced for the project. (KC)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED263357

CE042848

SPECIAL PROJECT:

DATA BASE FOR MILLMEN AND CABINETMAKER CURRICULUM

Final Report For Phase I

1984

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)
☐ This document has been reproduced as received from the person or organization originating it.
☐ Minor changes have been made to improve reproduction quality.
• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

CABINETMAKER

(woodworking) 660.280. carpenter, bench.

Sets up and operates variety of woodworking machines and uses various handtools to fabricate and repair wooden cabinets and high-grade furniture. Studies blueprints or drawings of articles to be constructed or repaired, and plans sequence of cutting or shaping operations to be performed. Marks outline or dimensions of parts on paper or lumber stock, according to blueprint or drawing specifications. Matches materials for color, grain or texture. Sets up and operates woodworking machines, such as power saws, jointer, mortiser, tenoner, molder and shaper, to cut and shape parts from woodstock. Trims component parts of joints to ensure snug fit, using handtools, such as planes, chisels or wood files. Bores holes for insertion of screws or dowels by hand or using boring machine. Glues, fits and clamps parts and subassemblies together to form complete unit, using clamps or clamping machine. Drives nails or other fasteners into joints at designated places to reinforce joints. Sands and scrapes surfaces and joints of articles to prepare articles for finishing. May repair high-grade articles of furniture. May dip, brush or spray assembled articles with protective or decorative materials, such as stain, varnish or paint. May install hardware, such as hinges, catches and drawer pulls. May repair furniture, equipment and fixtures and be designated as maintenance cabinetmaker. May be designated according to products made as piano-case maker. May cut, shape and assemble wooden parts to construct frames for refrigeration equipment and be designated as refrigerator cabinetmaker.

Source: Dictionary of Occupational Titles

BEST COPY AVAILABLE

TABLE OF CONTENTS

Page Title	Page Number
ABSTRACT/PROPOSAL	1
LIST OF CONTRIBUTORS	3
INTRODUCTION AND BACKGROUND	4
ACCOMPLISHMENTS	5/ 32
Task Inventory	
Materials	
Curriculum Outline	
PROBLEMS	33
EVALUATION PROCEDURES	33
GENERAL RECOMMENDATIONS	34
SPECIFIC RECOMMENDATIONS FOR CURRICULUM DEVELOPMENT	35/ 36
PROJECT FOLLOW-UP AND COMMITMENT	37
BUDGET FOR SPECIFIC RECOMMENDATIONS	37
ACKNOWLEDGEMENTS	38
APPENDICES	39
Appendix A - Request and Proof of Need to ARTAC	39/ 65
Appendix B - Background Material on Task Inventory	66/ 67
Appendix C - Survey Sample Sheet	68/ 77
Appendix D - Survey Results	78/100
Appendix E - Employer Interview, States' Outlines	101/102
Appendix F - Contacts and Addresses	103/118
Appendix G - Materials	119/188

VOCATIONAL RESOURCE CENTER
Oregon Department of Education
700 Pringle Parkway SE
Salem, Oregon 97310

7/20/83

ABSTRACT/ PROPOSAL

NEED:

This proposal is being submitted in response to a specific request made to the Oregon Alliance for Program Improvement for assistance in developing an adequate apprentice related training curriculum for cabinetmakers and millmen. During the past six months David Rasmussen of the Portland Joint Apprenticeship Committee has been developing a new task inventory for this occupational area. David, acting for the Portland J.A.C. has appeared before the Oregon Department of Education State Apprenticeship Related Training Advisory Committee at its last two meetings reporting on the work he has done and requesting assistance in the effort to develop curriculum materials. At its June meeting, the State Advisory Committee made the decision to inform the Department of Education that it appears there is a lack of adequate instructional materials in this occupational area and to recommend that the Department of Education provide assistance in determining the specific need. Assistance is needed in validating a current task inventory for cabinetmakers and millmen; conducting a national search for appropriate existing material; and identifying the specific needs for curriculum development;this proposal is in response to those situations.

PURPOSE:

The purpose of this proposal is to utilize the information already accumulated through the efforts of the Portland J.A.C. (David Rasmussen's work) in the following activities:

1. Producing a valid task inventory for the occupation of cabinetmaker/ millmen.

2. Identifying the components of a complete four year related training program commensurate with the prescribed clock hours for instruction.

3. Conducting a nationwide search for existing instructional material relating to the specified components identified.

4. Assessing the useability of the available materials.

5. Recommending what materials are acceptable as available, what is acceptable with modifications, and what materials need to be developed.

6. Estimating as closely as possible the cost of completing a full related training curriculum for cabinetmaking and millmen.

PROCEDURE:

The procedures for carrying out this project will be as follows:

1. A steering committee will be established to provide direction and evaluation functions. The Portland Committee will probably be the major resource due to the fact that it has been the driver behind this overall effort. An attempt will be made to have representation

from the other local J.A.C.s around the state. In any event concurrence will be sought from all J.A.C.s in the state on decisions relating to materials produced and/or adopted as a statewide program.

2. Materials produced will be submitted to the Oregon Department of Education's state related training advisory committee for approval.

3. A final report will be prepared and submitted to the Oregon Department of Education (five copies) containing information listed in Final Report Summary Requirements attached.

SPECIFIC PRODUCTS:

The following specific products will be produced in this project:

1. A current comprehensive task inventory for cabinetmakers and millmen that has been verified by industry personnel in Oregon.

2. A course outline developed for the total program broken down into the respective terms or segments of instruction. The course goals must be written in performance terms. The course must have the approval of the steering committee.

3. Provide at least one resource acceptable to the steering committee for each instructional item on the course outline or some recommendation for adaptation or development of appropriate materials.

4. Provide a final report, including an itemized listing of instructional modules needing to be developed or adapted, materials available that would provide an adequate instructional base for supporting a complete related training program. The report will have steering committee approval. The report will show estimated costs for any curriculum development or modifications recommended.

PROJECT STAFF:

The project will be under the direction of Dr. Daniel Dunham, Director of the Oregon Alliance for Program Improvement Center, Oregon State University. David Rasmussen, Portland Joint Apprenticeship Committee will coordinate the activities of the project steering committee. Other qualified persons will be utilized for specific tasks in carrying out the purpose or goals of the project.

FINAL REPORT:

The final report will follow the Oregon Department of Education, Guidelines for Preparation of Final Reports for Special Projects (copy attached) where applicable. In addition to information required in the "Guidelines" each report will have a copy of products listed Specific Products in this proposal items 1-4 inclusively.

CONTRIBUTORS

Author

David Rasmussen 232-2788
Committee Member
Portland Millmen and Cabinetmakers J.A.T.C.
3404 S. E. 14th Ave.
Portland, OR 97202

Director

Dr. Dan Dunham 754-2179
Oregon Alliance for Program Improvement
112 Batcheller Hall
Oregon State University
Corvallis, OR 97311

Review Committee

Galin Gunderson 666-9491
Alexander Manufacturing, Inc.
802 S. E. 199th Ave.
Portland, OR 97233

Gordon Richards 699-0360
Mit. Div. of Clark College
1800 E. McLoughlin Blvd.
Vancouver, WA 98663

Gary Markwarot 639-9636
Design Group, Inc.
5875 Lakeview Blvd.
Lake Oswego, OR 97223

Frank Zell and Jim Cliff 285-1923
Tom Boden Store Fixtures
8900 N. E. Vancouver Way
Portland, OR 97211

R. W. Desch 238-5500
Desch Woodworking
2820 S. E. 8th Ave.
Portland, OR 97202

Ron Gross 667-2220
Mt. Hood Woodworking
835 N. E. 8th St.
Gresham, OR 97030

Floyd Carson and Virgil Flath 224-5465
Specialty Woodworking Co., Inc.
1434 N.W. 22nd Ave.
Portland, OR 97201

Mike Grant 777-2291
5300 S. E. Johnson Creek Blvd.
Portland, Or 97222

INTRODUCTION AND BACKGROUND

This is the culmination of Phase I of a Curriculum Project funded by the State of Oregon's Apprentice and Related Training Advisory Committee (ARTAC) in a cooperative endeavor with David Rasmussen and the Millmen and Cabinetmakers Joint Apprenticeship and Training Committee (JATC) of Portland. Background material request to ARTAC in Appendix A. Its purpose is to produce or find an existing task inventory; compile an outline for the curriculum; search for materials or existing curricula; assess the useability of materials and make recommendations for any curriculum development. In case of inadequate materials, there are funds temporarily earmarked for the development of curricula. When the outline has been reviewed and the recommendations made, this will be recognized curriculum outline for the State of Oregon.

ACCOMPLISHMENTS OF PROJECT

Task inventory

Materials

Curriculum Outline

The task inventory was compiled and reviewed. Background materials in Appendix B. Using the mailing list of companies that responded to the training needs survey (survey part of Appendix A), companies were contacted for participation in task survey. Background in Appendix C. The task inventory was completed by a cross-section of industry personnel and the tasks compiled in descending order of importance. Survey results listed in Appendix D. The tasks were broken into headings and refined into a preliminary outline using the following as reference materials: employers survey; Gordon Richards employer interview recommendations; the present text -- Cabinetmaking and Millwork by Feirer; cabinetmaking and woodworking outlines from: City and Guilds of London, Alberta-Canada, Clark College-Washington, past Oregon state outlines, and a compilation of other states' outlines. Some of these references are listed in Appendix E; others listed in Contacts, Appendix F; and Materials, Appendix G).

Certain vital portions of the program are common to all subjects: safety, attitude, and business concepts. These are the responsibiity of the instructor to emphasize and integrate into the program as a whole.

Extensive research was done to find whether materials existed and at what level they were written, if they were up-to-date, and if they were the best. Contacts and addresses listed in Appendix F. As a side benefit, an apprentice library was formed to motivate apprentices and to provide material beyond the outline, and to create a central bank of information for industrial questions. The materials have been cataloged and preliminarily matched to the outline and certain recommendations made. Materials acquired, Appendix G.

HAND TOOLS

TASK INVENTORY

Employee	
Measure materials with folding rule or pull-out tape	2.3
Use clamps	1.9
Use clamps	1.8
Use straight edge	1.8
Use putty knife	1.7
Use screwdrivers	1.7
Use files	1.6
Use drill bits	1.6
Clean and sharpen hand tools	1.6
Use chisels	1.6
Use hand scrapers	1.6
Use countersinks	1.5
Hand work part to specified fit	1.4
Use nail set	1.4
Fasten parts together with glue only	1.4
Glue boards edge to edge	1.4
Use wrenches	1.4
Fit and fasten parts together with nails	1.4
Apply wood edges	1.3
Use level	1.3
Use block plane	1.3
Use levels	1.2
Use crosscut hand saw	1.2
Use vises	1.2
Mark angular & parallel lines with framing (rafter) square	1.1
Use calipers	1.1
Use scribers (dividers)	1.0
Use other planes (jointer plane, rabbet plane, bull-nose plane)	1.0
Use bench grinder	1.0
Use hand glue spreader	.9
Use dovetail saw	.9
Use pry bar	.9
Use scriber, dividers & trammel points to mark lines	.9
Use jack plane	.8
Use rasp	.8
Use hack saw	.8
Establish long lines with chalk line	.8
Use dado cleaners	.7
Use pinch dogs	.7
Use gouges	.6
Establish long level lines	.6
Use coping saw	.5
Use tenon saw	.5
Use plumb bob	.4
Use key hole saw	.4
Use brace and bit	.4

Employer	
Safety practices	2.9
Hand tools	2.3
First aid card	1.8

HAND TOOLS

MATERIALS

B
2 **Hand Woodworking Tools**
Leo P. McDonnell and Alson I. Kaumeheiwa
Delmar
273p. 1978

B
40 **Handtool Handbook For Woodworking**
R. J. DeCristoforo
H. P. Books
184p. 1977

B1C
76 **The Steel Square**
H. H. Siegele
192p. 1982

G9
139 **Getting The Most Out Of Your Drill Press**
Rockwell International
121p. 1978

F59
141 **Getting The Most Out Of Your Abrasive Tools**
Rockwell International
122p. 1979

B
169 (P) **Clamps-Their History And Their Uses**
Cincinnati Tool of Warren Tool
16p.

HAND TOOLS

OUTLINE - 12 CLASSES PER QUARTER	CHAPTER IN TEXT
1. Tape measure & steel square	19
A. Reading & calculations	
B. 3, 4, 5 rule	
C. Steel square uses	
D. Straight edge (making, care & uses)	
2. Marking & layout tools	19
A. Level	
B. Plumb bob	
C. Chalk line	
D. Miscellaneous	
3. Files & saw	20
A. Crosscut	
B. Miscellaneous	
C. Files	
4. Drill bits	22
5. Planes	21
A. Block plane	
B. Others	
6. Chisels & hand scrapers	21
7. Miscellaneous hand tools	
A. Hammers, etc.	
8. Clean & sharpen hand tools	24
9. Hand work part to specified fit	40
10. Clamp styles and practice	
A. Pinch dogs	
11. Fill, overrun & review	
12. Testing	

POWER HAND TOOLS

TASK INVENTORY

Employee

Use pneumatic stapler	1.9
Fit and fasten parts together with staples	1.9
Sand to prepare for finish	1.9
Use router	1.8
Use belt sander	1.8
Use variable speed reversing drill	1.7
Use drill bits	1.6
Choose type of cutting head or woodworking tool required	1.6
Use templates (jigs)	1.5
Use screw gun	1.5
Fit and fasten parts together with screws	1.5
Use router templates	1.3
Use laminate router	1.3
Use orbital sander	1.3
Use jig saw	1.3
Use mitre saw	1.3
Cut spline joint	1.2
Use table router	1.2
Use spline cutter	1.1
Use circle saw (skill saw)	1.1
Use bench grinder	1.0
Use disc sander	.9
Use hole saw and swing cutters	.9
Use dado cleaners	.7
Fasten parts together with glue heating unit (wood welder)	.6
Use powder actuated tools	.6
Use reciprocating saw	.5
Use Butterly plastic seam router	.5
Use hand power planer	.5
Use horizontal router jointer	.4

Employer

Safety practices	2.9
Use of power hand tools	2.6
Air nailers	2.3
Hand router	1.9
First aid card	1.8
Orbital sander	1.8
Table router	1.8
Hand belt sander	1.8
Jig & fixture template work	1.6
Miter saw	1.6
Screw guns	1.4
Hand jig saw	1.2
Disc sander	.9
Hand circular saw	.9

POWER HAND TOOLS

MATERIALS

A
22 **The Use of Portable Power Tools**
Leo P. McDonnell and Alson I. Kaumeheiwa
Delmar
218p. 1980

F59
141 **Getting The Most Out Of Your Abrasive Tools**
Rockwell International
122p. 1979

A7
165 (P) **Welding With Wood**
Workrite Products Company
30p.

A
215 **Milwaukee Training Manual**
Milwaukee Electric Tool Co.
237p. 1980

POWER HAND TOOLS

OUTLINE - 12 CLASSES PER QUARTER	CHAPTER IN TEXT
1. Portable saws	30
A. Types blade & uses	
B. Circle saw	
C. Mitre box	
2. Portable saws	30
A. Hand jig	
B. Reciprocating saw	
3. Router	33
A. Bits	
B. Laminate	
C. Size for job	
D. Template	
E. Splining	
F. Butterly seam	
G. Dado cleaners	
4. Router	33
A. Table	
B. Shaper work	
C. Horz router jointer	
5. Pneumatic and powder actuated guns	
A. Types of loads	
B. Application	
6. Variable reversing drill & screw gun	34
7. Wood welder	40
8. Belt sander	36
9. Orbital sander	36
A. In line	
B. Other random	
10. Misc. power planes, shears, pop riveter	
11. Fill, overrun & review	
12. Testing	

MATERIALS

TASK INVENTORY

Employee

Sand to prepare for finish	1.9
Read material lists	1.9
Use white glue	1.8
Select screws, staples, nails by size & type	1.7
Inspect for scratches that would show in finish	1.7
Inspect product for splits	1.7
Inspect for knots	1.7
Hand carry materials, rough or machined	1.7
Use factory trucks, 4-wheel dolly or hand truck to move materials	1.7
Read blueprints(detailed shop drawings)	1.6
Inspect for crown and warp	1.6
Cut material for size from layout or print	1.6
Fill wood cracks or dents with filler	1.6
Select lumber for size & identify species	1.6
Inspect for defective milling or planing	1.6
Mill rough lumber to straight & square	1.6
Inspect for blemishes	1.6
Inspect product for holes	1.6
Fit and fasten parts together with screws	1.5
Mark product for job identification	1.5
Read job orders	1.5
Cut material for size from cutting bill	1.5
Inspect for stain & color	1.5
Cut and install plastic laminate	1.4
Adjust moving parts (drawer guides, door hinges or roller) to obtain correct fit	1.4
Match grain of inter-related parts	1.4
Inspect for glue spots	1.4
Attach hardware to complete assembly	1.4
Fasten parts together with glue only	1.4
Inspect product for sharp edges	1.4
Determine materials	1.4
Fit and fasten parts together with nails	1.4

Employer

Safety practices	2.9
Hardwoods	2.4
Softwoods	2.3
Plywood	2.2
Knowledge of materials	2.2
Plastic laminate skill	2.1
Plastic laminate	1.9
Composite board	1.8
Hardware	1.5
Knowledge of grain matching	1.5
Veneer	1.1
Veneer skill	.9
Acrylic plastic	.9
Glass	.9
Metal	.6
Other (specify)	.5
Metalwork	.5

MATERIALS (Page 2)

TASK INVENTORY

Employee

Fit plastic laminate joints	1.3
Roll contact cement	1.3
Inspect products for mismatched grain	1.3
Use yellow glue	1.2
Mark inter-related parts	1.2
Use urea resin glue (brown)	1.2
Stack material for storage	1.2
Use fork lift	1.1
Fit and fasten parts together with hinges	1.0
Inspect product for missing hardware	1.0
Fit and fasten parts together with bolts	1.0
Mark product for part alignment	1.0
Select sheet stock by grade	.9
Use hand glue spreader	.9
Spray contact cement	.8
Cut veneer	.7
Fasten parts together with glue heating unit (wood welder)	.6
Cut veneer joint	.6
Assemble glass into frames	.6
Fit passage door hardware	.5
Layout veneer matches	.5
Cut glass	.4
Use veneer tapers	.2
Use lathe	.3
Use veneer cutter	.2

MATERIALS

C8
32 **Adhesives And Glues: How To Choose And Use Them**
Robert S. Miller
Franklin Chemical Industries
186p. 1980

C
84 **Understanding Wood**
R. Bruce Hoadley
Tauton Press
256p. 1980

C8
100 **Adhesive Bonding Of Wood**
M. L. Selbo
Drake
119p. 1978

MATERIALS

OUTLINE - 12 CLASSES PER QUARTER	CHAPTER IN TEXT
1. Wood	5
A. Nomenclature	
B. Introduction	
2. Wood	5
A. Cutting	
B. Measure	
C. Handling	
D. Defects	
3. Softwood identification	
4. Softwood identification	6
5. Hardwood identification	
6. Hardwood identification	7
7. Milling procedures	10
A. Wood action	
B. Millwork terms	
C. Wood bending	
D. Shaping	
8. Adhesives technology	40
A. Contacts	
B. Glues	
C. Mastics	
D. Others	
9. Adhesives application	
10. Abrasives	36
A. Finish problems	
11. Fill, overrun, review	
12. Test	

1. HP plastic laminate	43
A. Types	
2. Veneer & plywood	8
A. Matches	
B. Veneer technology	
C. Equipment	
D. Grading type plywood	
3. Composite board	9
A. Particle	
B. Waferboard	
C. Hardboard	
D. Homosote	
4. Fasteners	11
A. Staples	
B. Screws	
C. Nails	
D. KD	
5. Hardware	12
6. Hardware	12
7. Cloth & upholstery	
8. Acrylic plastic	
9. Glass	13
10. Metalwork	
11. Fill	
12. Test	

PLANNING PROCESSES

TASK INVENTORY

Employee	
Measure materials with folding rule or pull-out tape	2.3
Read material lists	1.9
Use straight edge	1.8
Read drawings (sketches)	1.7
Read blueprints(detailed shop drawings)	1.6
Cut material for size from layout or print	1.6
Choose type of cutting head or woodworking tool required	1.6
Use templates (jigs)	1.5
Mark product for job identification	1.5
Choose product assembly methods & procedures	1.5
Use math for cutting list, hours & job billing	1.5
Read job orders	1.5
Cut material for size from cutting bill	1.5
Determine set-up of machines or equipment	1.5
Determine machine operation & sequence required	1.5
Match grain of inter-related parts	1.4
Determine materials	1.4
Use math and geometry for layout	1.3
Estimate your individual labor time	1.3
Train personnel in procedures	1.3
Determine product layout & procedure	1.3
Mark inter-related parts	1.2
Lay out template	1.2
Use patterns	1.2
Mark angular & parallel lines with framing (rafter) square	1.1
Lay out patterns	1.1
Make story pole (rod) layout	1.0
Read story pole (rod) layout	.9
Use scriber, dividers & trammel points to mark lines	.9
Use architectural scale	.9
Sketch	.9
Read architectural drawings	.8
Establish long lines with chalk line	.8
Establish long level lines	.6
Layout shaper or sticker knives	.6
Draw to scale	.5
Use 100 ft. tape	.5
Draw in perspective	.5
Make preliminary job site measurements	.5
Use ordinary drafting tools	.5
Use various types of surveying equipment (water line/level, transit	.3

Employer	
Work orders & cutting bills	2.5
Single person or team start to finish	2.2
Shop drawings	2.0
WOULD IT HELP IF YOUR EMPLOYEES HAD KNOWLEDGE OF GENERAL BUSINESS PRINCIPLES AND SALES?	1.8
Print reading	1.8
Production set up	1.8
Business sense	1.5
Job measuring	1.4
Furniture	1.4
Kitchen cabinets	1.4
Line with classification (machine, assembly, finish)	1.4
Ability in geometry for layout	1.2
Millwork	1.2
Sketches	1.1
Word of mouth	1.1
Other (specify) Mouldings, door & window frames	1.1
Drafting	1.0
Estimating	.9
Doors & windows	.9
Architectural drawings	.9
Store fixtures	.8
Bank fixtures	.8
Display cases	.6
Production line	.3
Formal sketches	.2
Other (supervisory skills)	.2

PLANNING PROCESSES

MATERIALS

IE2
20 **Practical Problems In Mathematics For Carpenters**
Harry C. Huth
Delmar
217p. 1979

E5
28 **Furniture Construction**
Rudolph Willard
North Carolina State
321p. 1982

E
31 **Furniture Manufacturing Processes**
Anco L. Prak and Thomas W. Myers
North Carolina State
175p 1981

E6
435 **Rapid Viz-A New Method For The Rapid Vizualization Of Ideas**
Hanks and Belliston
William Kaufmann, Inc.
149p. 1980
E8
136 **Drafting Technology And Practice**
Dr. William P. Spence
Bennett Pub.
807p. 1980

E7
206 **Architectural Casework Details**
Architectural Woodwork Institute
11p. 1969

PLANNING PROCESSES

OUTLINE - 12 CLASSES PER QUARTER	CHAPTER IN TEXT
1. Business principles	
A. Labor relation	
B. Accounting	
C. Overhead	
2. Communication skills	
A. Teamwork	
B. Nomenclature	
C. Supervision	
D. Training personnel	
3. Production set up	
4. Building prints	2 & 3
A. Measuring jobs	
5. Design elements	
A. What makes a box rigid	
B. History	
C. Furniture design	
D. History & human measure	
6. Sketching	16
7. Sketching	
8. Detailed print reading	
9. Detailed print reading	
10. Fill, overrun, review	
11. Fill, overrun, review	
12. Test	

1. Cutting lists	
2. Math & basic geometry	
3. Layout	18
4. Material lists	15
A. Costing	17
B. Ordering	
5. Estimating	17
A. Labor time	
6. Layout	
A. Patterns	
B. Templates	
7. Millwork planning	
8. Knife layout	
9. Installation planning	
10. Fill, overrun, review	
11. Fill, overrun, review	
12. Test	

MACHINERY

TASK INVENTORY

Employee

Use variety table saw	2.0
Sand to prepare for finish	1.9
Use straight edge	1.8
Use jointer	1.8
Choose type of cutting head or woodworking tool required	1.6
Use band saw	1.5
Use radial arm saw	1.5
Determine set-up of machines or equipment	1.5
Determine machine operation & sequence required	1.5
Use drill press	1.4
Use thickness planer	1.4
Use mitre saw	1.3
Use jig saw	1.3
Use table router	1.2
Set cutter head or tool for prescribed operation	1.2
Use single-spindle shaper	1.1
Use manual stroke sander	1.1
Use straight line rip saw	1.1
Use jig saw	1.0
Use bench grinder	1.0
Use disc sander	.9
Use panel router	.8
Use panel saw	.7
Use horizontal boring machine	.7
Use sliding table saw	.7
Use abrasive planer	.7
Layout shaper or sticker knives	.6
Grind or sharpen tools or knives for machine	.6
Use pin router	.5
Use moulder (sticker)	.5
Use horizontal router jointer	.4
Use drawer machine	.4
Use cylinder sander	.4
Use automatic stroke sander	.4
Use contour sander	.4
Use tenoner	.4
Use chisel mortiser	.4
Use edge bander	.3
Use lathe	.3
Use double-spindle shaper	.2
Use chain mortiser	.2

Employer

Safety practices	2.9
Machining -	2.4
Machinery maintenance & care	2.3
Drill press	2.2
Jointer	2.1
Variety saw	1.9
Planer	1.9
Table router	1.8
Shaper or moulder work	1.6
Edge sander	1.6
Miter saw	1.6
Moulder or sticker	1.4
Knife grinding	1.2
Stroke sander	1.1
Sliding table saw	1.1
Pin router	1.0
Abrasive planer	1.0
Disc sander	.9
In line rip saw	.9
Panel router	.7
Mortiser	.6
Edge Bander	.4
Veneer equipment	0

MACHINERY

MATERIALS

F
27 **Production Woodworking Equipment**
Rudolph Willard
North Carolina State University
300p. 1980

F
90 **Power Tool Maintenance**
Daniel W. Irvin
291p. 1971

G345
138 **Getting The Most Out Of Your Table Saw**
Rockwell International
121p. 1978

G9
139 **Getting The Most Out Of Your Drill Press**
Rockwell International
121p. 1978

G6
140 **Getting The Most Out Of Your Band Saw**
Rockwell International
121p. 1978

F59
141 **Getting The Most Out Of Your Abrasive Tools**
Rockwell International
122p. 1979

G
179 (P) **Woodworking Planer Practice**
John E. Hyler
Ex-Cell-O Corp.
24p.

F
186 (P) **Planer Moulders: Their Performance And Productivity**
Timber Research and Development Assoc.
36p. 1978

F
187 (P) **A Guide To The Use Of Saws And Cutters**
Timber Research and Development Assoc.
48p. 1979

MACHINERY

OUTLINE - 12 CLASSES PER QUARTER	CHAPTER IN TEXT
1. Circle saws	26
A. In line rip saws	27
B. Variety saws	
C. Radial saws	
D. Sliding table saws	
2. Band saw	28
3. Jointer	31
4. Planer	25
5. Bench grinder	24
A. Abrasive wheels	
6. Knife sharpening	26
A. Shaper knife grinding	
7. Shaper	32
A. Single spindle	
B. Moulder	
8. Router	38
A. Panel router	
B. Table router	
C. Pin router	
9. Abrasive equipment	36
A. Stroke sander	
B. Abrasive planer	
C. Edge sander	
D. Disc sander	
10. Drill press - mortisers	34
11. Miscellaneous machinery	
12. Test	

MACHINE PROCESSES

TASK INVENTORY

Employee	
Measure materials with folding rule or pull-out tape	2.3
Use variety table saw	2.0
Sand to prepare for finish	1.9
Read material lists	1.9
Use router	1.8
Use straight edge	1.8
Use jointer	1.8
Inspect for scratches that would show in finish	1.7
Read drawings (sketches)	1.7
Inspect product for splits	1.7
Inspect for knots	1.7
Hand carry materials, rough or machined	1.7
Use factory trucks, 4-wheel dolly or hand truck to move materials	1.7
Read blueprints(detailed shop drawings)	1.6
Use drill bits	1.6
Pre-assemble to determine fit	1.6
Inspect for crown and warp	1.6
Cut material for size from layout or print	1.6
Choose type of cutting head or woodworking tool required	1.6
Select lumber for size & identify species	1.6
Mill rough lumber to straight & square	1.6
Inspect for blemishes	1.6
Use templates (jigs)	1.5
Mark product for job identification	1.5
Choose product assembly methods & procedures	1.5
Use math for cutting list, hours & job billing	1.5
Read job orders	1.5
Cut material for size from cutting bill	1.5
Use radial arm saw	1.5
Use band saw	1.5
Determine set-up of machines or equipment	1.5
Determine machine operation & sequence required	1.5
Inspect for stain & color	1.5

Employer	
Safety practices	2.9
Work orders & cutting bills	2.5
Machining	2.4
Machinery maintenance & care	2.3
Shop drawings	2.0
Joint construction	1.9
First aid card	1.8
Print reading	1.8
Jig & fixture template work	1.6
Ability in geometry for layout	1.2
Knife grinding	1.2
Sketches	1.1
Architectural drawings	.9
Formal sketches	.2

MACHINE PROCESSES (Page 2)

TASK INVENTORY

Employee

Match grain of inter-related parts	1.4
Use drill press	1.4
Glue boards edge to edge	1.4
Determine materials	1.4
Use dovetail machine	.4
Use router templates	1.3
Cut dado rabbet joint	1.3
Use mitre saw	1.3
Use math and geometry for layout	1.3
Mark cutting lines	1.3
Estimate your individual labor time	1.3
Inspect products for mismatched grain	1.3
Train personnel in procedures	1.3
Determine product layout & procedure	1.3
Cut spline joint	1.2
Cut rabbet joint	1.2
Mark inter-related parts	1.2
Lay out template	1.2
Set cutter head or tool for prescribed operation	1.2
Use patterns	1.2
Stack material for storage	1.2
Lay out patterns	1.1
Use single-spindle shaper	1.1
Use manual stroke sander	1.1
Mark product for part alignment	1.0
Use scriber, dividers & trammel points to mark lines	.9
Use hole saw and swing cutters	.9
Cut dowel joint	.7
Cut lap joint	.7
Make panel doors	.7
Layout shaper or sticker knives	.6
Cut mortise and tenon joint	.6
Make window frames	.6
Make windows	.5

MACHINE PROCESSES

MATERIALS

G345
138 **Getting The Most Out Of Your Table Saw**
Rockwell International
121p. 1978

G9
139 **Getting The Most Out Of Your Drill Press**
Rockwell International
121p. 1978

G6
140 **Getting The Most Out Of Your Band Saw**
Rockwell International
121p. 1978

G
179 **Woodworking Planer Practice**
John E. Hyler
24p.

MACHINE PROCESSES

OUTLINE - 12 CLASSES PER QUARTER	CHAPTER IN TEXT
1. Working from cutting bill print, layout	17
2. Sequence of work & type of machine	
3. Table saw blades, dado heads	
4. Table saw	26
A. Rip	
B. Crosscut	
C. Sliding table	
D. Over arm fence	
5. Table saw	26
6. Band saw	28
7. Jointer & Planer	25-31
8. Templates & jigs	
9. Drill press	34
A. Hole saw	
B. Swing cutter	
10. Templates & jigs	
11. Fill overrun, review	
12. Test	

Strength & practice Joints

1. Dado rabbet joints	1
2. Rabbet joints	
3. Spline joints - dowell joint	
4. Drawer joints	
5. Mortise & tenon	
6. Lock mitre	
7. Coves & moulding	
8. Dovetail joints	
9. Finger joints	
10. Mechanical joints	
11. Fill, overrun, review	
12. Test	

ASSEMBLY

TASK INVENTORY

Employee

Measure materials with folding rule or pull-out tape	2.3
Use variety table saw	2.0
Use pneumatic stapler	1.9
Use clamps	1.9
Fit and fasten parts together with staples	1.9
Read material lists	1.9
Sand to prepare for finish	1.9
Use router	1.8
Use white glue	1.8
Use clamps	1.8
Use belt sander	1.8
Use straight edge	1.8
Use jointer	1.8
Use variable speed reversing drill	1.7
Select screws, staples, nails by size & type	1.7
Inspect for scratches that would show in finish	1.7
Read drawings (sketches)	1.7
Inspect product for splits	1.7
Inspect for knots	1.7
Hand carry materials, rough or machined	1.7
Use factory trucks, 4-wheel dolly or hand truck to move materials	1.7
Read blueprints(detailed shop drawings)	1.6
Use files	1.6
Use drill bits	1.6
Clean and sharpen hand tools	1.6
Pre-assemble to determine fit	1.6
Inspect for crown and warp	1.6
Fill wood cracks or dents with filler	1.6
Inspect for defective milling or planing	1.6
Mill rough lumber to straight & square	1.6
Inspect for blemishes	1.6
Inspect product for holes	1.6
Use templates (jigs)	1.5
Use countersinks	1.5
Fit and fasten parts together with screws	1.5
Mark product for job identification	1.5
Choose product assembly methods & procedures	1.5
Read job orders	1.5

Employer

Safety practices	2.9
Air nailers	2.3
Plastic laminate skill	2.1
Pin router	1.0
Shop drawings	2.0
Hand router	1.9
Hand belt sander	1.8
First aid card	1.8
Knowledge of grain matching	1.5
Sketches	1.1
Word of mouth	1.1
Laminating & wood bending	1.1
Rod or panel layouts	1.0
Architectural drawings	.9
Architectural door casing hanging	.5
Metalwork	.5
Architectural paneling	.3
Formal sketches	.2

ASSEMBLY (Page 2)

TASK INVENTORY

Employee	
Cut and install plastic laminate	1.4
Adjust moving parts (drawer guides, door hinges or roller) to obtain correct fit	1.4
Match grain of inter-related parts	1.4
Inspect for glue spots	1.4
Attach hardware to complete assembly	1.4
Hand work part to specified fit	1.4
Fasten parts together with glue only	1.4
Inspect product for sharp edges	1.4
Inspect product for loose joints	1.4
Fit and fasten parts together with nails	1.4
Use router templates	1.3
Fit plastic laminate joints	1.3
Use laminate router	1.3
Roll contact cement	1.3
Apply wood edges	1.3
Mark cutting lines	1.3
Estimate your individual labor time	1.3
Inspect products for mismatched grain	1.3
Train personnel in procedures	1.3
Cut spline joint	1.2
Fit and fasten parts together with splines	1.2
Use yellow glue	1.2
Mark inter-related parts	1.2
Use spline cutter	1.1
Fit and fasten parts together with hinges	1.0
Use other planes (jointer plane, rabbet plane, bull-nose plane)	1.0
Inspect product for missing hardware	1.0
Fit and fasten parts together with bolts	1.0
Fit and fasten parts together with dowels	1.0
Read story pole (rod) layout	.9
Use hand glue spreader	.9
Use scriber, dividers & trammel points to mark lines	.9
Establish long lines with chalk line	.8
Install finish carpentry	.7
Cut veneer	.7
Work with other trades to install cabinetwork	.6
Establish long level lines	.6
Assemble glass into frames	.6
Use 100 ft. tape	.5
Hang panelling	.5
Make solid core doors	.4

ASSEMBLY

MATERIALS

H10b
71 **Interior Finish: More Tricks Of The Trade**
Bob Byvanen
East Woods Press
126p. 1982

H10a
74 **Stair Layout**
Stanley Badzinski, Jr.
American Technical Publishers
72p. 1971

F
27 **Production Woodworking Equipment**
Rudolph Willard
North Carolina State University
300p. 1980

H3
111 **Purpose-Made Joinery**
E.V. Foad
Van Nostrand Reinhold
204p. 1982

ASSEMBLY

OUTLINE - 12 CLASSES PER QUARTER	CHAPTER IN TEXT
1. Nomenclature & history	38
2. Frame & panel construction	44
3. Doors & windows	10
4. Case work construction	51 & 52
A. European	
B. Face frame	
5. Cabinet doors	45
6. Cabinet drawers	46
7. Kitchen cabinets	53
8. Fixturess & jigs	66
A. Design for installation	
9. Showcases & furniture	66
10. Arch furnishings & staircases	
11. Fill overrun, review	
12. Test	

1. Print & layout reading	16
2. Assembly layout	
A. Pre-assembly	
3. Appropriate use of	11
A. Staples	
B. Screws	
C. Clamps	
4. Plastic laminate layout	43
A. Procedures	
B. Timing	
5. Plastic laminate work	
A. Jointing	
B. Inlay	
6. Wood edging & trim	
7. Cabinet door hardware	
8. Cabinet drawer hardware	
9. Quality control check	
A. Hardware	
B. Sanding	
10. Finish hardware	
11. Fill, overrun, review	
12. Test	

FINISH

TASK INVENTORY

Employee		Employer	
Sand to prepare for finish	1.9	Finish & spray	1.4
Inspect for scratches that would show in finish	1.7		
Fill wood cracks or dents with filler	1.6		
Inspect for blemishes	1.6		
Inspect for stain & color	1.5		
Inspect for glue spots	1.4		
Inspect product for sharp edges	1.4		
Use orbital sander	1.3		
Wipe stain	.9		
Steam dents	.8		
Spray contact cement	.8		
Hand fashion patches	.8		
Spray finishes	.6		
Spray stain	.5		
Use pressure pot spray gun	.4		
Roll paint	.4		
Use airless spray gun	.3		
Use cop spray gun	.2		

FINISH

MATERIALS

O
6 **Furniture Finishing Textbook**
Furniture Production Pub. Co.
120p. 1977

D
61 **Finishing Technology**
George A. Soderberg
McKnight & McKnight
308p. 1969

D
184a-q **Binks Training Materials**
Content: Safety spray booths, spray application processes, spray equipment selection

FINISH

OUTLINE - 12 CLASSES PER QUARTER	CHAPTER IN TEXT
1. Importance of finish	56
A. Terminology	
B. Pre-finish operations	
C. Types	
2. Wood stain	59
A. Color theory	
3. Equipment & Maintenance	57
4. Wood stain application	59
A. Step panel	
B. Oil finishes	
5. Fillers & sealing	60
6. Top coats	
7. Top coats	61
8. Repair & rubbing	62
9. Paint	
10. Fill	
11. Fill, overrun, review	
12. Test	

PROBLEMS

Searches of vocational data bases were of little help.

Much of the material specific to the industry is out-of-print and is aggravated by an inventory tax change which forces publishers to destroy old inventory. Most of the remaining materials are inadequate for a professional woodworking course because they are oriented to high school shop and to hobbyists.

Materials for professionals seem to be available in Britain, but because of the length of correspondence time and the time limits of the project, they have been unavailable as a resource.

EVALUATION PROCEDURES

A review committee of industrial representatives and the present apprenticeship instructor met on Saturday, February 25th, from 10:00 to 3:00 at the Charles Grant Company, 5300 S. E. Johnson Creek Blvd., to review outline and materials for appropriateness and to make recommendations to ARTAC for further curriculum materials.

RECOMMENDATIONS

These are the recommendations made as part of the February 25th meeting. Some of these are suggestions for running the program; the others are specific requests for curriculum material development.

General Recommendations

As a whole, the outline with the materials suggested was approved with a recommendation that all the materials gathered on a particular segment be listed as references. These are listed in Appendix G.

The text Cabinetmaking and Millwork by Feirer was retained as the primary text book. The comment was made that the text tests are inadequate because they test only text reading and are not application related. It was decided that the instructor was better able to design proper tests. The instructor, Gordon Richards, tentatively agreed to file copies of the tests for the outline as they are prepared. The employer survey and the members of the review committee agreed that math was very important in the program. Instead of a concentrated math class, it was recommended that math practice be integrated throughout the course using application-related problems; i.e. framing square problems, geometry in layout, pattern knife layout, material measure, costing, caliper use, and machine set-up. Metric measurement as applied to usage more than as applied to conversion was recommended to become an integral part of the program.

In order to be effective as an educational tool, the outline should: 1) Always be accompanied by the task inventory list to be used as a reference, 2) Be reviewed annually to ascertain any problems in application or material needs.

Specific Recommendations

1) Materials concerning the portable router to be developed. Materials on this subject have existed but are out-of-print. Research could be done to explore copyrights on those materials. The materials need to cover: care, safety, and a full discussion of stationary uses, portable uses, uses of patterns and templates, inlay, and specialized plastic laminate routers.

2) Materials concerning the power mitre box to be developed. Materials to cover care, safety, and uses.

3) Materials covering the planning process segment of the outline. Since a large portion of companies hire into management positions from within their ranks, it was recommended that materials be developed covering business principles fundamental to good management and to a good understanding of the industry from a labor point-of-view.

    a. The fundamentals of business principles as they apply to the woodworking trade: overhead, accounting, bidding, work flow, production set-up, supervision, estimating individual labor time, estimating in general.

    b. Communication skills covering teamwork, nomenclature, and especially in-depth materials on sketching and print reading including: the drafting and sketching of fixtures, caseworks, and furniture; elevations, plans, cross-sections, and overlay furniture drawing.

Recommendation was made that the developer of these materials work closely with industry personnel, especially in the areas of print reading and business principles.

4) There was a consensus among the review committee that theory classes have a better retention if they are backed with some types of practical experience. Theoretically, this was to be attained by the on-the-job training (OJT) hours, but there is no control over the on-the-job experience as it relates to a night or quarter of classes. This will be partly remedied by a consistent outline to which the employers can refer. In addition, it was recommended that a project be designed so that parts of the project would be built, designed, measured, or machined to compliment and support the theory of each class. The idea is not new. The Canadians and the British use such projects and the concepts fall in line with the thrust toward performance based curricula.

The product should be designed to use the core skills or tools of a segment to make a part or parts of the finished product; i.e., Hand Tools segment: use saw to cut, plane to edge-joint, clamps to edge-glue, plane to flat-surface a panel for a door (to be used in the finished product).

Keeping in mind that the theory is of primary importance, the project should be simply designed to incorporate as many skills as possible from the outline. The project should incorporate the following:

1. Have a furniture orientation (credenza, bookcase, stereo cabinet)
2. Be of knock-down (KD) type
3. Have at least two drawers
4. Be of frame and panel design with as many different joints as possible.
5. Use some high pressure (HP) plastic laminates
6. Include for each segment: a drawing, material lists, and cutting bills.

The making of the project as a product is also to provide illustration and insights into business principles. Such a project will facilitate material budgeting and planning for a school or committee.

Project Follow Up and Commitment

It is imperative that interested parties have this information made available without having to search through normally difficult bureaucratic channels. It is suggested that the outline or the knowledge of its existence be distributed to industrial personnel, community colleges, high schools and other vocational training agencies. The full potential of this project cannot be realized if it gathers dust in a file or drawer. This concept, along with industrial annual review, will make this project a continually useful educational tool.

Budget For Specific Recommendations

Using the estimated budget of Phase II of The Development of Apprenticeship Related Training Curriculum for Maintenance Millwright, Stationary Engineer, and Low Voltage System Installers as an example, we estimate it will take $15,000 in adaptation or direct writing costs to produce usable modular materials for the four sections in the recommendations previous.

It is suggested that all four sections be let as a package in one bid so that the project can be integrated into the other segments and to allow interested industrial references to deal with a single organization.

ACKNOWLEDGEMENTS

This is the end of a project that started more than a year ago. In that time, indispensable help has been given by many people, especially: A & B Secretarial Service, Betty Hauge; Mary Ann Dabritz; the review committee; Ralph Little, Department of Education; Bill Zorzanello, Judy Bobair; Book Vault, Beaverton; and a special thanks to Mike Grant, my boss, for understanding and allowing the time off necessary to complete this project.

This paper presents ideas for a future curriculum for cabinetmakers in the state of Oregon, including a brief history and the state of the present curriculum for apprentices. It is compiled by the Portland Millmen & Cabinetmakers J.A.T.C. which has been working with apprentices for more than 38 years. The appendices include: trade statistics and economic impact, bibliography of books from programs in other states and related materials, a statewide survey of private sector businesses in woodworking, and letters from other T.A.T.C.'s around Oregon supporting the need for a new curriculum. We hope to persuade you that such a curriculum can benefit not only our trade, but the people of the state of Oregon by helping to maintain a thriving secondary wood products industry. This is a time-honored and popular trade that has suffered greatly from the business cycle fluctuations of the recent past and without adequately trained personnel, could lose its share of the market to other states.

The present apprenticeship standards, which are uniform throughout the state, are listed in Appendix A. The related training portion has been sufficient at times, depending on the instructor(s) running the program. Matters came to a head last year when the present instructor wanted to resign. The ensuing examination of the situation brought forth the realization that the curriculum was basically the instructors perogative and that all we actually had was the outline in Appendix B.

The committee started looking for other instructors, but realized there was a problem in that the hourly wage for instruction, without preparation time, is $16.00 With adequate preparation time, this works out to be less than Journeyman's wage rate. The lack of a concise curriculum makes the situation even more difficult for a new instructor.

With that in mind, the committee sought to redefine and update the curriculum and perhaps to find an already compiled curriculum among the states. There were discussions about what was needed and finding a task analysis (occupational inventory) for cabinetmaking. It was felt that the program had too little hands-on training within the related training. The basis argument went as follows:

- The payback for apprentices was too steep to encourage further hiring.
- The apprentices themselves voiced discontent with a class composed largely of theory lectures.
- The on-the-job training (OJT) hours sometimes reflect just the running of a machine set up by a journeyman, and does not necessarily represent a true knowledge.
- A theory class and the OJT hours that relate to it may not correspond, which does not reinforce the retnetion of that theoretical knowledge.

There was also some discussion on how to develop the cognitive skills in areas of: production techniques, motion study, effective use of time, and a fundamental business knowledge that would help the apprentice appreciate that aspect of his trade. It was felt these were needed to cultivate mental flexibility and attitudes to use the training skills efficiently and allow adaptation to differing employment situations.

The modular system that we now use was judged to be the best because it allows for maximum flexibility in entry and numbers of apprentices, which have varied in the past from 10 to 35, (Appendix C) and east of handling with multi-year students with one instructor. This also may allow the course to be augmented with private (non-apprentice) sector students by the Community College involved. The present text, Cabinetmaking & Millwork, Feirer, was deemed to be the best, but needed augmentation because the workbook was too simple and some chapters needed expansion, i.e. Materials, Finishing.

The decision involved in choosing what to emphasize brought us to search out a task analysis and an employer survey so we could judge objectively the important knowledge and skills required of the trade. We instigated a book and curriculum search to find materials that could be used for the augmentation of present materials and to determine the basic emphasis of other programs. The contacts and results of the search are listed in Appendix D.

Our first inquiries found no task analysis for the cabinetmaking trade. For future objectivity, we decided to write our own which was compiled and submitted to Warren Suzuki at Oregon State University and to Gordon Richards of Clark College.

The committee thought the best first step in a solution would be to seek out, if possible, a full-time instructor. Gordon Richards of the Mechanical Industrial Technology Division of Clark College, Vancouver, Washington was contacted and seemed to be responsive to the idea of becoming that instructor. The Clark

College curriculum is based on residential cabinetmaking and is a linear program (following a course consecutively 1, 2, 3 years). This type of course would require modification and Gordon Richards asked our help in working up a program for the apprentices.

There was much discussion on the integration of hands-on projects into the related training portion of the program. The task analysis would not limit, but would provide the basis for deciding the emphasis of the theory and directing the design of the projects. The basic concept of the projects is two-fold; first to reinforce retention of the theoretical knowledge with practical tactile projects, and secondly to assure the apprentice would have tactile exposure to the basic skills as outlined by the task analysis. The idea of designing a project that would be central to all the modules could have these effects:

- Providing continuity to the modules
- Giving the apprentice some exposure to concepts not received until later
- Simplifying material purchasing and budgeting
- Making the project salable for the cost of the materials

Secondary smaller projects to illustrate individual techniques need not be salable or a part of the central project. Further explanation is in Appendix E.

The committee was looking for an up-to-date, research-based curriculum, broken down into subject modules so they could be used with maximum flexibility with varying numbers of apprentices. The theory and practicum would have equal weight with the areas of emphasis being derived from a task analysis. The practicum would have designed products to reinforce theory knowledge and to strengthen basic skills.

It also became apparent that more time and energy than planned would be necessary to pull the resource material together or write a curriculum. In our search for help, we came in contact with Ralph Little and the Apprentice Related Training Advisory Committee (ARTAC) and verbally presented a request for help on December 2, 1982.

In our search, we found most existing curriculum usable only with substantial modification for all or some of these reasons:

- Out of date (10 years or older)
- Too simple (designed for high school)
- Too heavy an accent on furniture or hand processes Theory, along with little or no hands-on projects

At their invitation, we submitted a written request for assistance to ARTAC on February 17, 1983. We were told the request would be considered but that we would have to demonstrate the need. The written request is shown in Appendix F.

The committee contacted the other six standard-holding T.A.C.T.'s around the state and they said they would write a letter stating the need, or lack thereof. The names and letters are in Appendix G.

The committee also surveyed the provate woodworking industry statewide to ascertain whether good training systems existed or were needed. The results of this survey are shown in Appendix H. In order to decide if we had the prerequisits to warrant the state's expenditure for curriculum development, we gathered some employment statistics from our own trade and, for comparison, from some other trades previously funded for curriculum development. The Classification of Instruction Programs (CIP's) are listed in Appendix I.

In the CIP's covering cabinetmakers, 1983 employment for cabinetmakers was 1025 with average openings of 129. This does not include all the occupations that could benefit from the proposed training program, but does show a good idea of the numbers of one subgroup affected. The CIP also shows a percentage of this group as being self-employed. Since most growth in employment comes from small companies, this may be in our favor. Many past apprentices are part of this group.

The openings due to industrial growth rate of 2.9% is above average and compares favorably with other programs presently funded. This occupation is stated to cycle with business fluctuations, so present statistics also reflect the recession heavily.

In the Occupational Employment Trends in the State of Oregon 1979-81 (copies of pages shown in Appendix J), cabinetmakers are listed under the heading "Furniture and Fixtures SIC 251 - SIC 254". This shows an optimistic view of the trade if the interest rates stay down or continue to drop. The marketing problems can be viewed either way. Oregon may be a good place for growth, considering its location between Seattle and San Francisco. Later on in the publications, employment statistics for cabinetmakers show the majority of openings are attributed to retirement, which may indicate a shortage of young, trained personnel if the economy expands.

At some point after our third contact with ARTAC, we were given a sheet of Apprentice Curriculum Materials Development Procedures found in Appendix K.

In our determination we have covered almost to Step #7 in Phase I, making it fairly easy to proceed with sending out a bid proposal for the writing of a curriculum for cabinetmakers and millmen. This is the area where we would appreciate some help. We will continue to compile information and to work with the industry and other T.A.C.T.'s to gather ideas, but we do not have the financial resources, the time, or the expertise for compiling a comprehensive, competency-based program with tests and evaluation techniques.

STATE OF OREGON
APPRENTICESHIP AND TRAINING COUNCIL

Portland Millmen-Cabinetmaker JATC

1. Apprenticeship Occupation to be taught: Cabinetmaker (D.O.T. 660.280.010).

HOURS OF EMPLOYMENT

2. 6,000 hours approximately of on-the-job training are required for completion of apprenticeship with a minimum of 5500 hours.

WORK PROCESSES AND APPROXIMATE HOURS

3. The work processes to be learned and the approximate hours required for each process are:

a.	Band saws and re-saws	50 hours
b.	Double and single end tennoning dowell pin machine	25 hours
c.	Drum belt and disk sanding	400 hours
d.	Electric portable machines & pneumatic machines	600 hours
e.	Frame layout and assembly	600 hours
f.	Glue operations	500 hours
g.	General cabinet, bench assembly, layout & hand tools	1,350 hours
h.	Jointer and variety saws	1,000 hours
i.	Planers, sticker and knife grinding	400 hours
j.	Shapers	100 hours
k.	Rip saw, cutoff saw, saw filing and stock room	400 hours
l.	Plastic laminates and related miscellaneous	575 hours
	TOTAL	6,000 hours

RELATED TRAINING

4. 144 hours of related training shall be required each year unless determined otherwise by the appropriate apprenticeship committee. Related training shall cover the following subjects:

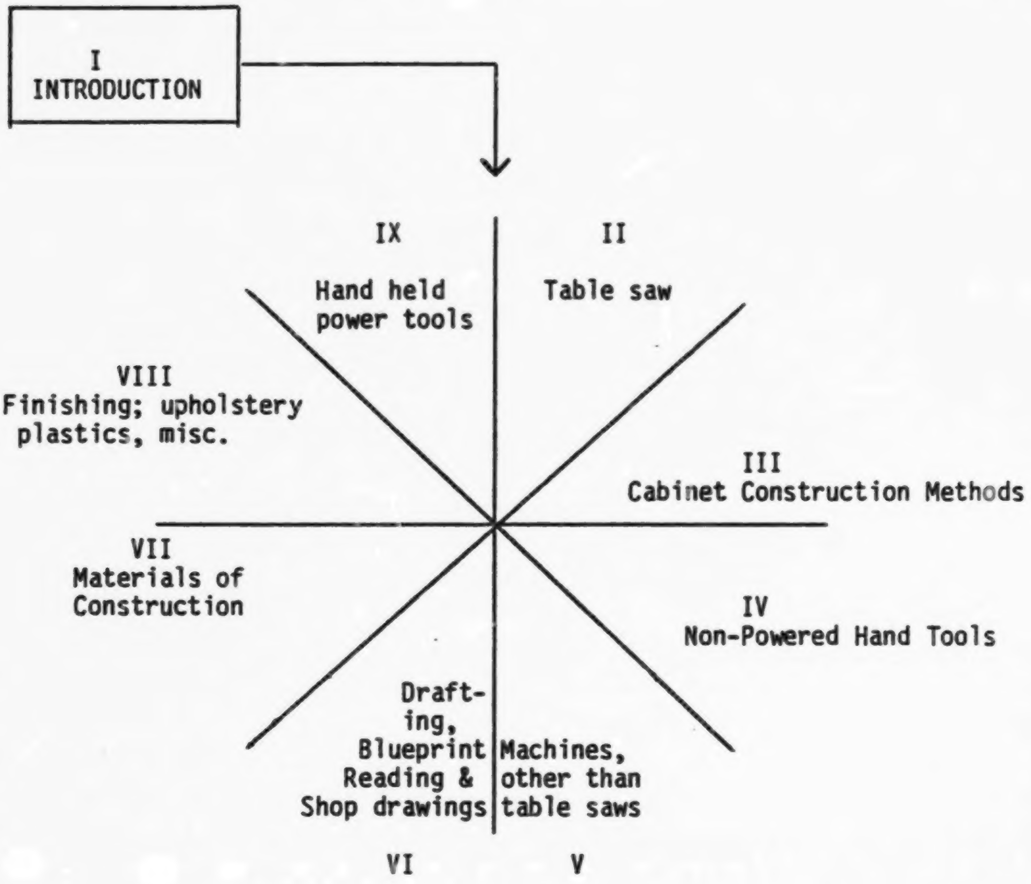
   a. Sketching and drawing
   b. Blueprint reading
   c. Mathematics
   d. Identification of materials
   e. Layouts
   f. Elements of cabinetmaking
   g. Instructions related to other fields
   h. Safety practices
   i. First aid
   j. Trade history and relations

GEOGRAPHICAL AREA

5. The geographical area to which these standards apply is: Multnomah, Washington, Yamhill, Clackamas and Columbia Counties in Oregon and Clark County in the State of Washington.

MILLMEN CABINET APPRENTICESHIP COURSE

OLD ORDER:


I
INTRODUCTION
IX
Hand held power tools
II
Table saw
VIII
Finishing; upholstery plastics, misc.
III
Cabinet Construction Methods
VII
Materials of Construction
IV
Non-Powered Hand Tools
Drafting, Blueprint Reading & Shop drawings
Machines, other than table saws
VI
V

NEW ORDER

1. Introduction	(Paul)
2. Hand tools	(Paul)
3. Table saw	(Paul)
4. Blueprints, shop drawing	(Paul)
5. Hand-held power tools	
6. Cabinet construction methods	
7. Materials of construction	
8. Machines, other than table saw	(Earland)
9. Upholstery, finishing, plastics, misc.	(Earland)

U.S. Department of Labor
Employment and Training Administration
Bureau of Apprenticeship & Training
1220 S.W. 3rd Aveune FB#840
Portland, Oregon 97204

Reply to the Attention of:

StATIS MILLMEN CABINETMAKERS

As of Date	Areas I Portland	II Linn/Bent.	II Salem	III Eugene	IV Roseb.	IV So.West Or*	V Gr.Pass	V Med.	VI Pend.
Dec. 31,'75	21	3	8	2	4	1	0	0	0
June 30,'76	21	4	5	2	3	1	0	0	1
Dec. 31,'76	19	4	5	2	3	1	0	0	1
June 30,'77	18	2	8	8	4	1	0	0	1
Dec. 31,'77	26	2	7	9	1	1	2	0	**
June 30,'78	31	1	5	7	2	1	2	0	
Dec. 31,'78	38	2	7	10	3	**	2	**	
June 30,'79	40	2	5	9	4		3		
Dec. 31,'79	42	2	6	6	4		3		
June 30,'80	50	2	7	5	4		3		
Dec. 31,'80	27	2	8	4	3		2		
June 30,'81	20	1	6	2	3		1		
Dec. 31,'81	17	1	6	1	3		1		
June 30,'82	11	1	9	0	2		0		
Dec. 31,'82	11	1	9	0	2		0		

*Coss Bay

**Dropped

Contacts

Bibliography

States Break Down

Pat Hagerty, UBC Local 1928, Vancouver, B.C.; 1-604-525-1091

Gordon Richards, MIT Div., 1800 E. McLoughlin, Vancouver, WA 98663

Warren Suzuki, OSU School of Education, Vocational Technical Education Division, Corvallis, OR 97331; 754-2961

Ralph Little, Dept. of Education, 700 Pringle Parkway, SE, Salem, OR 97310; 378-8376, home 393-3170

Nancy Hargis, CIP's Statistics; 378-8146

Carl Horstrup, Lane Community College; 747-4501, ext. 2496, home 445-2692

Duane Stevenson, Employment Statistics, Employment Division, OPPS, Dept. of Human Resources, 875 Union St., NE, Salem, OR 97311

Bill Daniels; (206) 753-0879, Northwestern Vocational Curriculum Management Center, Bldg. 17, Airdustrial Park, Olympia, WA 98504

Ed Morlan, U.S. Dept. of Labor, Bureau of Apprenticeship and Training, 840 Federal Building, 1220 SW Third, Portland, OR 97204 State Search

National Network for Curriculum Coordination in Vocational and Technical Education, Curriculum Search, Barbara Luckner, Western Curriculum Coordination Center, University of Hawaii, 1776 University Avenue, Honolulu, HI 96844

The National Center for Research in Vocational Education, Sarah Williams, Program Assistant, 1960 Kenny Rd., Columbus, OH 43210

George D. Sinclair, Marketing Services, Ontario Furniture Manufacturers Association, 6900 Airport Rd., Mississauga, Ontario L4V1E8 Canada

* Dr. Ann Benson, Mid-America Vocational Curriculum Consortium, Stillwater, OK

Randy Hughey, Graduate Student, OSU; 754-1313

* Conserva, Inc. 1735 I Street, NW, Suite 805, Washington, DC 20006

M. J. Ziokowki, National Association of Furniture Manufacturers, 5515 Security Lane, #550, Rockville, MD 20852

University of North Carolina, Industrial Extension Service, Box 1125, New Bern, NC 28560

BEST COPY AVAILABLE

APPENDIX D (Continued)

* SE Curriculum Coordination Network, PO Drawer DX, Mississippi State, MS 39762
(601) 325-2510, TT-197-6467-1981

Milwaukee Area JATC, 3020 W. Vliet St., Milwaukee, WI 53208

* Have not as yet contacted

	ALABAMA	ALBERTA (theory)	(trainin	CALIFORNIA	HAWAII 569	MASSACHUSETTS 12	WISCONSIN 954	NORTH CAROLINA	OHIO	TEXAS	WASHINGTON	AVERAGE
INDIVIDUAL DEVELOPMENT												
History, Reading												
Job & Human Relations												
Apprenticeship requirements												
Occupational regulations												
Small Business Concepts												
Economics		7	2	6	6		4	18		5	2	5
SHOP DRAWING												
Drafting, Blueprint reading												
Layout, Estimating												
Design, Job billing												
Installation			17	14	28	28	25	40	28	14	1[illegible]	21
SAFETY												
First Aid		.2	.4	1	2			1		2	.[illegible]	.8
MATERIALS		1	3	12			2	1	14	7	9	5
HARDWARE	10	.5	1							2	7	
Fasteners, Adhesives		.7	.7	3						3	5	3
HANDTOOLS	16	.7	2	5	2		2		28	11	3	7
JOINTS		2	5	3	2					2		1
LAMINATE												
Wood Bending, Veneer												
Plastic Laminate	10	.5	2	4	3	14				3	5	5
MACHINERY	10	5	11	13			14			18	25	10
PRACTICAL MACHINERY & ASSEMBLY												
Stair Construction	43	8	18	19	34	70	42	22	28	18	11	
Kitchens, Power Hand Tools												37
Doors, Windows, & Casements											17	
EXPLOSIVE TOOLS		.2	.4									
FINISHING		.5	1	1			4		14	5		3
MATH			10	14	14		4	17		7	.4	7

BEST COPY AVAILABLE

To illustrate the concept of a central project, and, in some respects, any project, we will follow an example of how it should work.

The apprentice would be assigned the appropriate theory reading relating to the upcoming class. Half the class would be devoted to discussing, augmenting and testing for retention of the text and to assure that the material had been understood. The other half would be devoted to the application of the theory to specific hands-on projects such as: blueprint (drawing), materials of contruction (choosing, testing, identification, and working with), table saw (saw cuts, differing joints, sizing panels, and handling).

A central project might work like this: During the module Drafting Blueprint, the student is assigned readings on basic lines, perspective, et al; the student comes to class, reviews material and is tested (to reinforce outside reading and to give the instructor a gauge for the speed of the class). The student then performs these objectives: draws a sketch of a cabinet, makes a list of materials, calculates waste factor, makes a scale drawing, makes a labor and material estimate. (This covers performance objectives 47-51 of V-Techs Occupational Inventory Catalog) During the module Materials of Construction, the student is assigned readings to study; composite materials (chipboard, plywood and plastic laminate); comes to class, reviews material and is tested, then performs these objectives: assembles the top of the cabinet drawn (chipboard top with hardwood edge. Plastic laminate jointed 45° to the center of the top and plastic laminate edging on the sides). This would fulfill performance objectives 1-8 of V-Techs Occupational Catalog. And so forth...

The new student entering the program at the materials module, after having missed blueprint reading, would be working from a drawing and thereby getting exposure to elements of blueprint that normally would not be received until the third year. This, as an example, shows the reinforcement and continuity that could be attained by having a project common to all modules.

This project or projects would need to be closely supervised in order to assure that teams of 1, 2, or 3 would divide the work evenly and encouraging the third-year students to assume supervisory roles for those things on which they have had OJT experience. This would teach some communication skills and experience in supervision while keeping third year students interested, but not dominating the project.

(Continued)

Other hands-on projects that do not have a common thread may be involved. This would be at the instructor's discretion as necessary to illustrate things from the class. The main points to having an ongoing project are: for continuity and exposure, for budgeting the program, and for knowledge of materials needed for purchase or donation from participating shops.

The concept of a salable project has the advantage of allowing the recapture of material cost. This leaves resources to spend in the direction of improving texts and resource material. These materials require updating and can be a cost drain. If passed on to the student this would become cumbersome. If properly planned, this project would become a source of pride among the apprentices, perhaps increasing motivation.

F

PORTLAND MILLMEN & CABINETMAKERS J.A.T.C.

2828 SW. Corbett

Portland, Oregon 97201

Apprenticeship
Training Council

February 17, 1983

Mike Murphy, Chairperson
Oregon Department of Education
Apprentice Related Training Advisory Committee
700 Pringle Parkway, SE
Salem, OR 97310

ATTN: Ralph Little

Dear Mr. Murphy:

This communication is to follow up a verbal request of December 2, 1982, for assistance in development of a viable curriculum for Millmen & Cabinetmakers J.A.T.C.

The state of Oregon and the Portland area have been pioneers in the forest industry since early in this century. The efforts in the primary industries of lumber and composite wood products are highly visible. Less visible, but equally important, have been the secondary industries ranging from components to finished goods; molding to furniture. In times of a burgeoning economy employing at least 3800 people, these products have been shipped nationwide. Now, in these times of recession, though less visible, lives a struggling woodworking industry; from cabinet shops for homebuilding to large fixture shops that service large architectural firms. We are faced with an aging work force (45 - 55 years of age, average) in an ever more competitive environment.

In the past, our curriculum has been a skeletal syllabus. The substance of the program has been at the discretion of the tradesman instructor, and usually leaving with that instructor. The syllabus accents have been on theory with no correlated hands-on projects. Due to apprentices entering the program with less amounts of pre-exposure, we need a curriculum that is up-to-date, consistent from one instructor to the next, whose theory is integrated with hands-on projects within the related training program. In the research the committee has done to resolve our problem, we have found curriculums from many states. These were often sketchy, out of date, with almost no hands-on projects. Our committee is constrained by a lack of time and personnel to give the focus this curriculum needs. We appeal to you for help.

The Committee feels the eventual economic recovery of this state hinges not only on the technical frontiers, but the wise use of our primary resources in the forest industry. The diversification of that industry, to make it less susceptible to economic swings, indicates the need for a secondary finish products industry. The finish products industry serves many fine architectural firms whose business might go elsewhere, the retailers with store fixtures, the high tech industry with cabinets and benches, the homebuilders, etc. A solid training program will help foster the maintenance and growth of an industry destined to hold an important place in the future of this state. Thank you for any assistance you can give us.

Sincerely,

David Rasmussen
J.A.T.C. Committeemember

DR/td
opeu #11
afl/cio

LOCAL UNION NO. 1961
United Brotherhood of Carpenters and Joiners of America
INSTITUTED AUGUST 12, 1881
ALWAYS DEMAND THE LABEL
ROSEBURG, OREGON 97470

March 29, 1983

Dave Rasmussen
3404 S.E. 14th
Portland, Oregon 97202

Dear Dave,

I would like to commend you for your efforts in helping to focus attention on and find solutions to the problem of related training materials for apprenticeship classes in the mill and cabinet industry.

As a long time member of the Roseburg Carpenters T.A.T.C., which is the committee responsible for training millwork and cabinet apprentices in this area, I have seen first hand the problems faced in trying to put together a quality related training program for these apprentices.

They seem to have fallen victim to the numbers game which demands adequate numbers to warrant attention and expenditures of dollars for curriculum development.

I have felt for some time that there are enough apprentices throughout the state in the millwork and cabinet industry to justify a commitment from the various agencies involved to produce an up to date, quality program that could be shared by apprentices across the state.

The Metro area is the obvious location to focus attention on the development of this effort but I will be glad to help with any specifics that might seem appropriate.

Hoping to hear from you as progress is made.

Sincerely,

Mike

Mike Wooton, Secretary
Roseburg Carpenters T.A.T.C.

MW:tc

PORTLAND MILLMEN & CABINETMAKERS J.A.T.C.

2828 SW. Corbett

Portland, Oregon 97201

APPRENTICESHIP COMMITTEE
J.A.T.C.
Portland
Apprenticeship
Training Council

March 23, 1983

Gentlemen:

We are researching the need for a training program for professional woodworkers; a broad and thorough program that would lend itself to custom or efficient production work. We would like your response to a few questions concerning your personnel. Your accurate responses would be of great help in setting up a workable program.

Please take a few minutes to fill out and return the enclosed postage paid card.

Thank you very much for your time.

Sincerely,

PORTLAND MILLMEN &
CABINETMAKERS J.A.T.C.

David P. Rasmussen
Committee Member

DPR/td
opeu #11
afl/cio

enclosure

1. **Do you find qualified people off the street?** ________

   How often? ______________________________

2. **Do you find secondary (high school) wood shop satisfactory for pre-employment training?** ________

3. **Is there a satisfactory training program in your area?** ________

   If so, where? ______________________________

4. **Do you train in-house for most positions?** ________

5. **What is the average age of your employees?** ________

6. **Do you see expansion of your labor force in the future?** ________

Any questions or suggestions are welcome. Your responses are greatly appreciated.

PORTLAND MILLMEN & CABINETMAKERS APPRENTICESHIP COMMITTEE

120 Questionnaires mailed

Response Rate 25% as of April 1, 1983

Question 1. 48% YES with comments such as: seldom (twice), once a year, continually, 50%, when needed, average, 6 out of 10, not often, rarely (twice)
58% NO

Question 2. 27% YES
62% NO
13% SOMETIMES

Question 3. High School 1
CC 2
JATC 2
75% NO

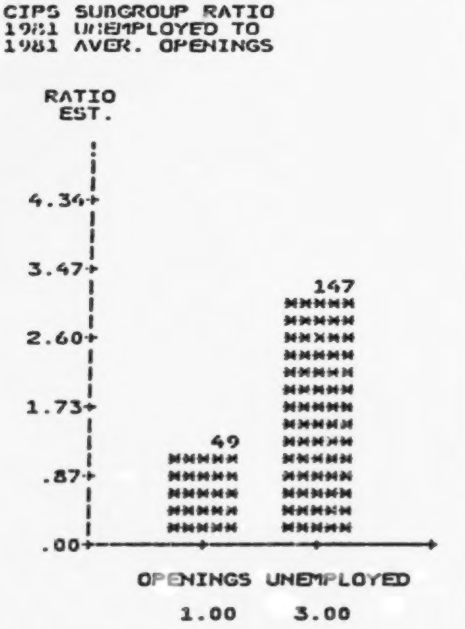
Question 4. 100% YES

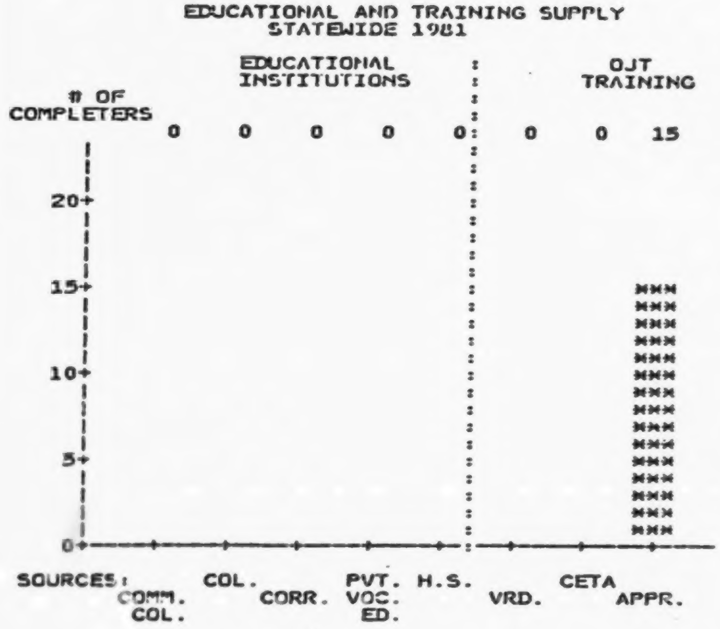
Question 5. 35 years

Question 6. 59% YES
31% NO
10% Don't know

BEST COPY AVAILABLE

CIPS: 47050100 STATIONARY ENERGY SOURCES





CHARACTERISTICS: STATIONARY BOILER FIRER

WAGE/SALARY: NA

EMPLOYMENT BY MAJOR INDUSTRY:

36%	SAWMILLS & PLANNING MILLS (242)
27	MILLWOOD , PLYWOOD & STRUC. MEMBERS (243)
6	HOSPITALS (806)
6	PAPER MILLS (262)

JOB REQUESTS BY INDUSTRY:
INCONSEQUENTIAL NUMBER RECEIVED

WORKING CONDITIONS: SOME WORK SITES MAY NOT BE CLEAN OR WELL-LIGHTED. THERE IS EXPOSURE TO NOISE, HIGH TEMPERATURES, DIRT, OIL, AND GREASE. THERE MAY BE FUMES WHICH COME FROM FUEL SOURCES. MAY INVOLVE WORKING IN UNCOMFORTABLE POSITIONS, KNEELING, CROUCHING, OR CRAWLING IN SMALL SPACES. MAY INCLUDE NIGHT OR WEEKEND WORK.

ANALYSIS: A SURPLUS OF WORKERS IS INDICATED FOR THIS CIPS. THE RATIO OF UNEMPLOYED TO OPENINGS IS THREE TO ONE. THE UNEMPLOYMENT RATE FOR STATIONARY BOILER FIRER IS SLIGHTLY ABOVE AVERAGE AT 13%. THE EMPLOYMENT DIVISION REFERS AN AVERAGE OF FIVE PERSONS FOR EVERY JOB OPENING IT RECEIVES. OPENINGS FOR STATIONARY BOILER FIRER DUE TO AN INDUSTRIAL GROWTH RATE OF .5% IS EXTREMELY BELOW AVERAGE.

BEST COPY AVAILABLE

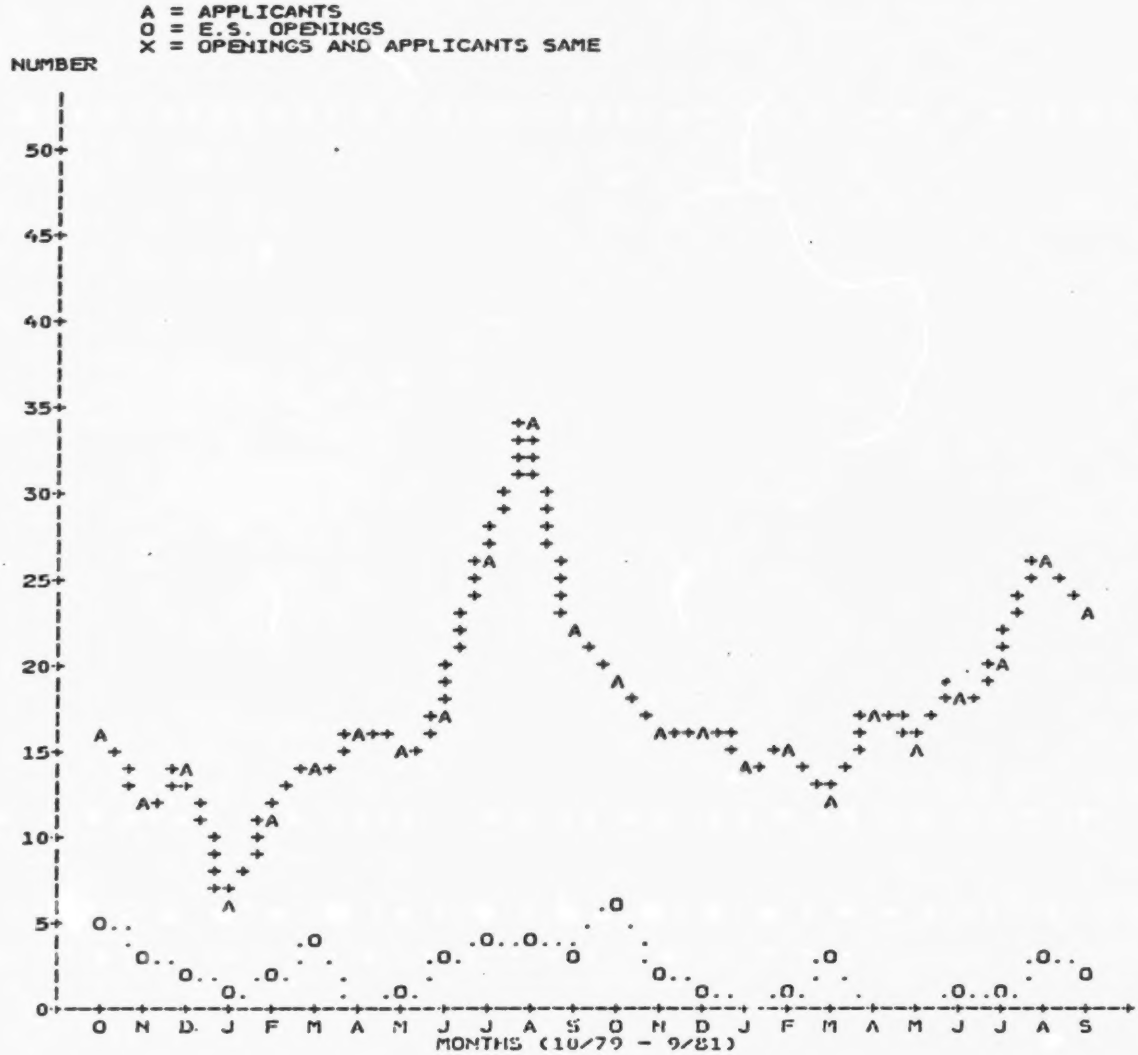
BEST COPY AVAILABLE

CLUSTER: 08 MECHANICS

CIPS: 47050100 STATIONARY ENERGY SOURCES

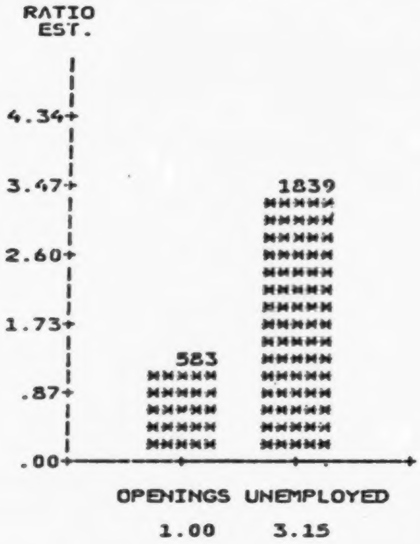
CIPS DESCRIPTION: AN INSTRUCTIONAL PROGRAM THAT GENERALLY PREPARES INDIVIDUALS TO INSTALL, OPERATE, AND MAINTAIN LARGE POWER SOURCES USED FOR SUCH PURPOSES AS GENERATING ELECTRICITY, PUMPING, AND HEATING.

	1983 PROJECTED EMPLOYMENT	1983 PROJECTED AVERAGE OPENINGS	1981 AVERAGE ANNUAL ESTIMATED UNEMPLOYED
CIPS SUBGROUP TOTAL	1278	51	147
STATIONARY ENGINEER	650	26	57
STATIONARY BOILER FIRER	602	24	90
CONTROL ROOM OPERATOR	26	1	0

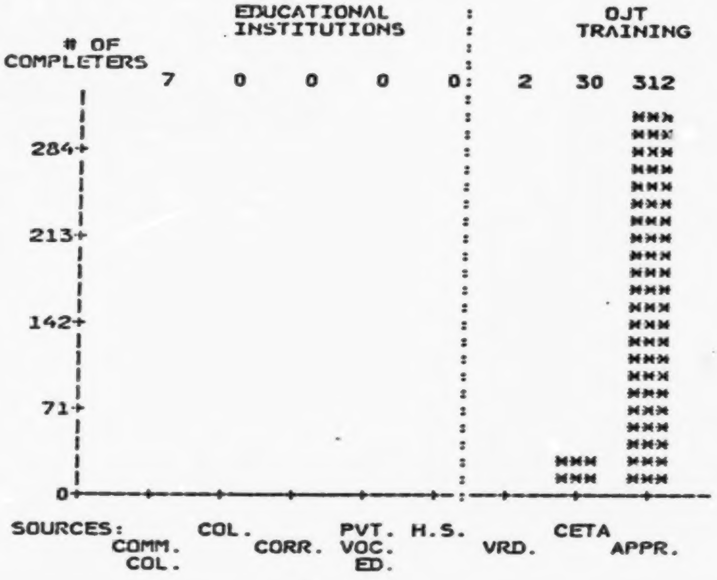


CIPS: 47030000 INDUSTRIAL EQUIPMENT MAINTENANCE

CIPS SUBGROUP RATIO
1981 UNEMPLOYED TO
1981 AVER. OPENINGS



EDUCATIONAL AND TRAINING SUPPLY
STATEWIDE 1981



CHARACTERISTICS: MECHANIC MAINTENANCE
WAGE/SALARY: $8.50(L)-11.00(A)-14.00(H) HOUR
EMPLOYMENT BY MAJOR INDUSTRY:

20%	SAWMILLS & PLANNING MILLS (242)
14	MILLWORK, PLYWOOD & STRUC. MEMBERS (243)
7	MFG FRUITS & VEGETABLES (203)
5	PAPER MILLS (262)
5	WHLS MACHINERY EQUIP & SUPPLIES (508)

JOB REQUESTS BY INDUSTRY:
17% MFG FRUITS & VEGETABLES (203)
REMAINDER ACROSS ALL INDUSTRIES

WORKING CONDITIONS: SOME INJURIES MAY BE EXPECTED IN THE REPAIR OF MACHINERY BUT THE JOB IS RELATIVELY SAFE. MECHANICS MAY WORK IN STOOPED OR CRAMPED POSITIONS OR ON HIGH LADDERS. DIRT OR GREASE MAY SOIL CLOTHING DUE TO THE NATURE OF WORK.

ANALYSIS: A SURPLUS OF WORKERS IS INDICATED FOR THIS CIPS. THE RATIO OF UNEMPLOYED TO JOB OPENINGS IS THREE TO ONE. THE EMPLOYMENT DIVISION REFERS AN AVERAGE OF FIVE INDIVIDUALS FOR JOB OPENING IT RECEIVES. THE INCREASE IN ANNUAL OPENINGS DUE TO INDUSTRIAL GROWTH IS LOW AT 1%. EDUCATIONAL SUPPLY IS 12% OF ANNUAL OPENINGS. HOWEVER, THE UNEMPLOYMENT RATE FOR MAINTENANCE MECHANICS IS BELOW AVERAGE AT 6%.

BEST COPY AVAILABLE

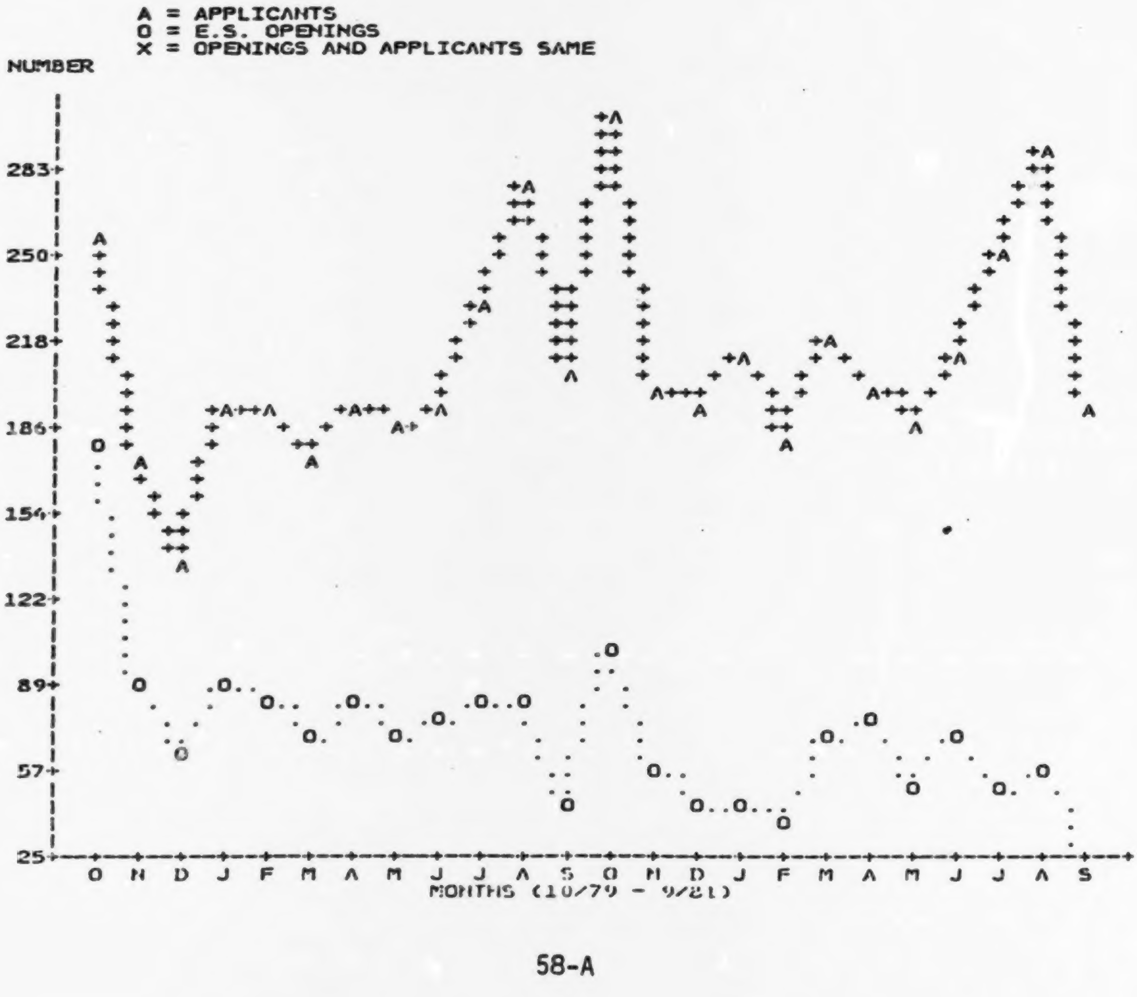
BEST COPY AVAILABLE

CLUSTER: 08 MECHANICS

CIPS: 47030000 INDUSTRIAL EQUIPMENT MAINTENANCE

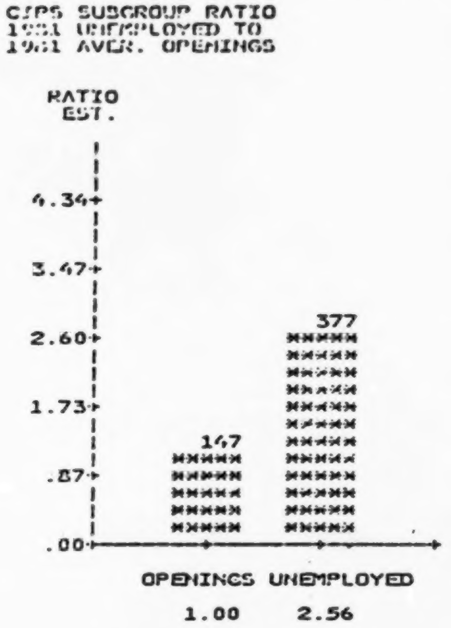
CIPS DESCRIPTION: A GROUP OF INSTRUCTIONAL PROGRAMS THAT PREPARE INDIVIDUALS TO OPERATE, MAINTAIN, AND REPAIR HEAVY-DUTY EQUIPMENT SUCH AS BULLDOZERS, CRANES, GRADERS, TRACTORS, TRAILERS, CONCRETE MIXERS, CRAWLER-MOUNTED SHOVELS, DRAGLINES, AND COMPRESSORS.

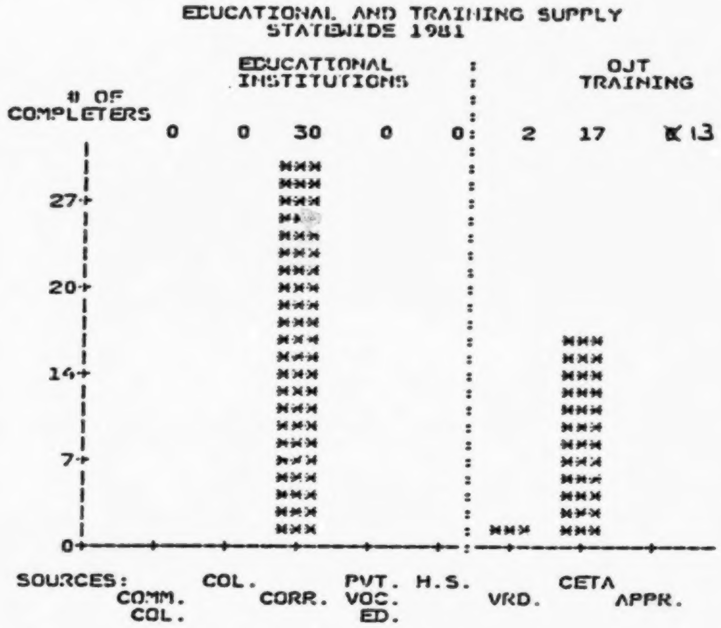
	1983 PROJECTED EMPLOYMENT	1983 PROJECTED AVERAGE OPENINGS	1981 AVERAGE ANNUAL ESTIMATED UNEMPLOYED
CIPS SUBGROUP TOTAL	16166	604	1839
MAINTENANCE REPAIRER,GEN.UTILI	6772	248	769
MECHANIC MAINTENANCE	5765	223	376
ENG. EQUIPMENT MECH	1891	69	244
MILLWRIGHT	697	30	616
OILER	604	20	28
HYDROELECTRIC MACH MECHANIC	211	7	3
MACHINE SET-UP OPER, PAPER GOO	134	3	1
TREATMENT-PLANT MECHANIC	44	2	1
MINE MACHINERY MECHANIC	19	1	0
FORMING MACHINE UPKEEP MECHANI	16	1	0
KNITTING MACHINE FIXER	13	0	1



58-A

CIPS: 48070300 MILLWORK AND CABINET MAKING


CIPS SUBGROUP RATIO
1981 UNEMPLOYED TO
1981 AVER. OPENINGS


EDUCATIONAL AND TRAINING SUPPLY
STATEWIDE 1981

CHARACTERISTICS: CABINET MAKER
WAGE/SALARY: $5.00(L)-11.00(H) HOUR
EMPLOYMENT BY MAJOR INDUSTRIES:
31% MILLWORK, PLYWOOD & STRUCTURAL MEMBERS (243)
17% FURNITURE & HOME FURNISHINGS (571)
14% PARTITIONS & FIXTURES (254)

JOB REQUESTS BY INDUSTRY:
33% LUMBER & WOOD PRODUCTS (240)
25% FURNITURE & FIXTURES MFG. (250)
14% FURNITURE & HOME FURNISHINGS STORE (571)

WORKING CONDITIONS: WORK FOR FINISH CABINET MAKERS IS TYPICALLY INDOORS. CABINET MAKERS MAY BE SUBJECT TO INJURIES FROM POWER EQUIPMENT SUCH AS SAWS AND DRILLS.

ANALYSIS: ABOUT 27% OF CABINETMAKERS ARE SELF-EMPLOYED. DATA INDICATE A SURPLUS OF CABINETMAKERS WHO WORK FOR WAGES OR SALARIES. THE RATIO OF UNEMPLOYED TO OPENINGS IS 2.5 TO 1. THE UNEMPLOYMENT RATE FOR CABINETMAKERS IS CONSIDERABLY ABOVE AVERAGE AT 23%. THE EMPLOYMENT DIVISION REFERS AN AVERAGE OF FOUR PERSONS FOR EVERY JOB OPENING IT RECEIVES. OPENINGS FOR CABINET MAKERS DUE TO AN INDUSTRIAL GROWTH RATE OF 2.9% IS ABOVE AVERAGE. OCCUPATIONS IN THIS CIPS ARE SENSITIVE TO BUSINESS CYCLE FLUCTUATIONS.

BEST COPY AVAILABLE

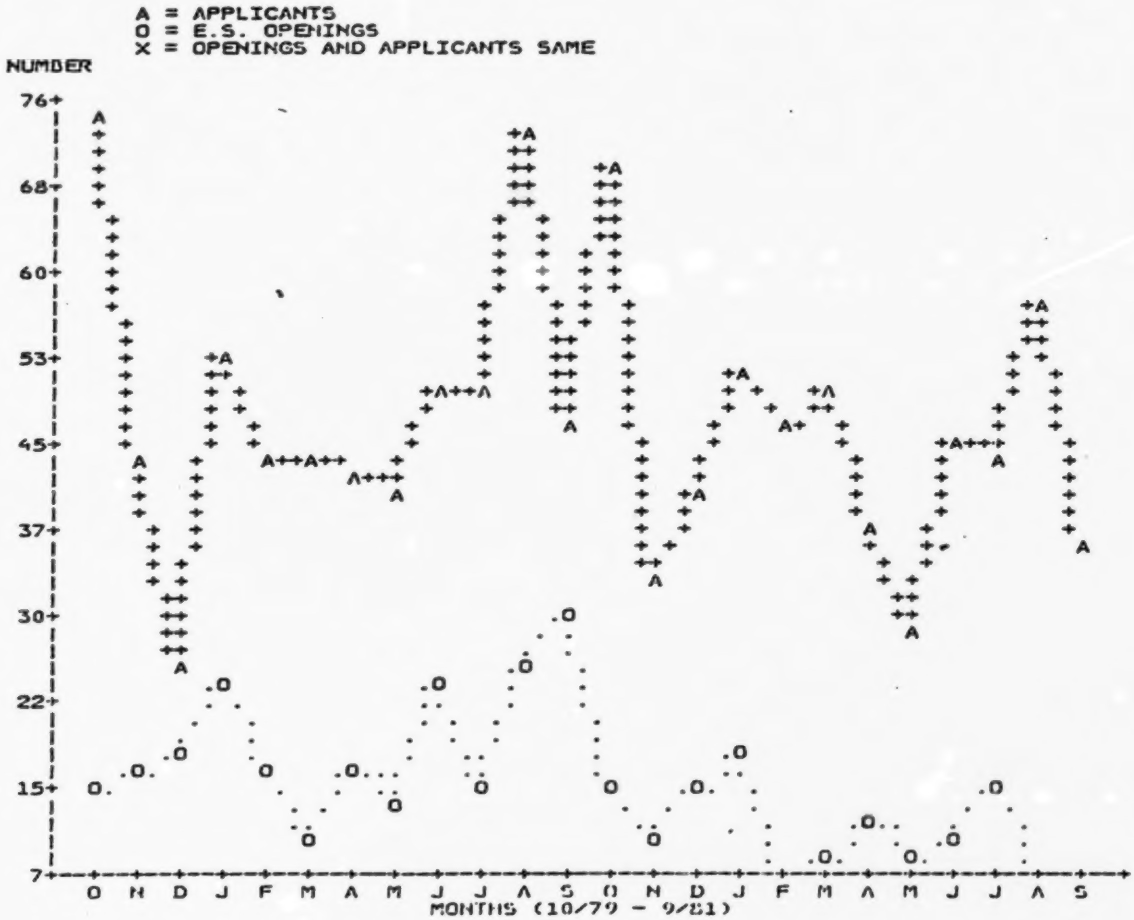
BEST COPY AVAILABLE

CLUSTER: 09 CONSTRUCTION

CIPS: 48070300 MILLWORK AND CABINET MAKING

CIPS DESCRIPTION: AN INSTRUCTIONAL PROGRAM THAT PREPARES INDIVIDUALS TO ENGAGE IN THE MASS PRODUCTION OF SUCH ARTICLES AS WINDOW FRAMES, MOLDINGS, TRIM AND PANELS; AND SUCH PRODUCTS AS STORE FIXTURES, KITCHEN CABINETS, AND OFFICE EQUIPMENT. INCLUDES INSTRUCTION IN CUTTING, SHAPING, ASSEMBLING, AND REFINISHING ARTICLES; INSTALLING HINGES, CATCHES, DRAWER PULLS, AND OTHER HARDWARE; AND PLANNING AND DRAFTING LAY OUTS.

	1983 PROJECTED EMPLOYMENT	1983 PROJECTED AVERAGE OPENINGS	1981 AVERAGE ANNUAL ESTIMATED UNEMPLOYED
CIPS SUBGROUP TOTAL	1431	157	377
CABINET MAKER	1025	129	298
FURNITURE FINISHER	153	15	36
FURNITURE ASSEMBLER & INSTALLE	122	8	1
NAIL MAKING OPER	74	4	7
LAMINATING MACH OP FURNITURE	38	1	1
BAND SCROLL SAW OPER	11	0	20
SHAPER HAND	6	0	0
PICTURE FRAMER	2	0	14



Furniture and Fixtures

The manufacture of household furniture (SIC 251) accounts for two thirds of the employment in this industry. Another 20% make partitions, shelving, lockers and fixtures for stores and offices (SIC 254). while 5% manufacture furniture for churches, assembly halls, schools and other public places.

Employment in this industry grew steadily through the sixties, and reached a peak of 3700 in 1973. It fell below 3,000 during the housing slump in 1975 and has never fully recovered, reaching 3200 in 1978 and falling below 3,000 in 1979, and below 2700--a 17 year low--in 1980.

Installment buying makes up a large part of the market for furniture; therefore demand is sensitive to interest rates. Some furniture manufacturers go out of business during periods of recession. Since this is a relatively small industry, the rate of recovery of the industry will depend on economic decisions made by relatively few owners.

Oregon is a net importer of furniture and fixtures, in spite of the low local costs of softwood lumber, veneer and particleboard. There are several possible economic reasons for this. Furniture and fixtures manufacture is becoming increasingly mechanized. Because of the expense involved in keeping up to date technologically and the financial grounding needed to weather periods of slack demand, the industry is becoming concentrated in fewer and larger firms. The need for markets of greater volume is a major reason for the congregation of large furniture producers in metropolitan areas. Transporting raw materials to the factories is a minor cost compared to tranporting the finished furniture to the retailers. Therefore large furniture and fixture firms find it profitable to locate near urban centers and have Oregon lumber and particleboard shipped to them.

Continuing migration into Oregon should result in a resurgence of demand for furniture and fixtures, if marketing problems can be solved. A partial recovery is predicted for this industry with a projected employment of 3300 in 1987.

Stone, Clay, Glass and Concrete Products

This manufacturing industry group (SIC 32) includes firms making products from materials taken from the earth in the form of stone, clay or sand. In Oregon this industry employs 4300 workers, of which 3100 work in the manufacture of concrete and 600 are employed in the manufacture of glass products.

The construction industry is the greatest source of the demand for concrete, including ready-mixed concrete and prefabricated concrete products (SIC 327) and hydraulic cement (SIC 324), as well as brick and tile (SIC 325).

BEST COPY AVAILABLE

OES/IO MATRIX MANPOWER PROJECTIONS
AREA - OREGON STATEWIDE

TABLE 2-AVERAGE ANNUAL JOB OPENINGS
(FOR WAGE AND SALARY EMPLOYMENT)

OCCUPATIONAL TITLE	TOTAL JOB OPENINGS, 1982 NUMBER	PCT.OF TOTAL	PCT.OF EMPL.	OPENINGS DUE TO GROWTH	OPENINGS DUE TO LABOR FORCE SEPARATIONS
BENCH HAND BAKERY	4	0.01	9.76	2	2
CAKE DECORATOR	11	0.02	8.27	6	5
FOOD SHAPER, HAND	1	0.00	3.70	0	1
CABINET MAKER	112	0.16	10.57	12	100
CARPET CUTTER & /OR LAYER	43	0.06	4.17	35	8
CRANE OP/DERRICK OP & HOIST OP	55	0.08	3.77	14	41
LOADER ENGINEER	13	0.02	1.90	-6	19
YARDER ENGINEER	10	0.01	1.97	-4	14
MERCHANDISE DISPLAYER/WINDOW TRI	16	0.02	7.05	7	9
DENTAL LABORATORY TECHNICIAN	47	0.07	6.61	29	18
FURNITURE FINISHER	12	0.02	8.33	4	8
FURRIER	2	0.00	8.33	1	1
GLASS INSTALLER	5	0.01	5.81	3	2
GLAZIER	32	0.05	5.25	19	13
LOG INSPECTOR GRADER/SCALER	61	0.09	6.17	33	28
LUMBER GRADER	27	0.04	2.29	-7	34
VENEER GRADER	53	0.07	2.48	-8	61
INSPECTOR	256	0.36	7.80	149	109
BUILDER INSPECTOR, FIRE INS.	6	0.01	7.23	3	3
MILLER FOOD	2	0.00	4.88	1	1
MOTION PIC PROJECTION	14	0.02	4.55	2	12
LENS GRINDER	2	0.00	6.67	1	1
OPTICIAN DISP &/OR OPTIC MECH	45	0.06	6.20	29	16
SHIP FITTER	12	0.02	6.98	7	5
SHOE REPAIRER	9	0.01	10.84	2	7
ALTERATION TAILOR	77	0.11	12.96	21	56
SAMPLE MAKER	5	0.01	11.63	1	4
FURNITURE UPHOLSTERER	12	0.02	7.79	6	6
SPRINGER FURNITURE	3	0.00	7.32	1	2
UPHOLSTERER	10	0.01	5.18	3	7
UPHOLSTERY CUTTER	1	0.00	3.57	0	1
MATTRESS MAKER	1	0.00	4.76	0	1
HEAVY EQUIP MECH INCL DIESEL	309	0.44	3.94	98	211
ENG. EQUIPMENT MECH	81	0.11	4.73	35	46
HYDROELECTRIC MACH MECHANIC	9	0.01	5.17	4	5
MINE MACHINERY MECHANIC	4	0.01	6.15	2	2
MARINE MECHANIC	3	0.00	3.90	1	2
MECHANIC MAINTENANCE	200	0.28	3.63	51	149
TREATMENT-PLANT MECHANIC	2	0.00	8.00	1	1
MACHINE SET-UP OPER, PAPER GOODS	6	0.01	4.00	3	3
SHIP ENGINEER	4	0.01	3.77	1	3
OTHER MECHS & REPAIRERS	417	0.59	5.01	245	172
BICYCLE REPAIRER	13	0.02	8.12	8	5
CAMERA/MOTION PICTURE CAMERA REP	1	0.00	7.14	1	0
ELECTRIC MOTOR REPAIRER	31	0.04	6.46	18	13

DUE TO THE USE OF UNROUNDED DATA IN THIS TABLE, OCCUPATIONS MAY SHOW OPENINGS DUE TO GROWTH WHICH SHOW ZERO GROWTH IN TABLE 1 are listed. First, new positions need to be filled in the various occupations corresponding to the growth in the state's economy. These are called "openings due to growth."

Jobs are vacated each year by workers leaving the labor force through retirement, or prematurely because of disability or death. This second source of job openings is listed as "openings due to labor force separations."

These estimates refer to the numbers of jobs expected to open in 1982; no reference is made to the numbers of workers who will compete to fill them. The following is a column by column description of the contents of Table 2.

Column 1: Occupational Title This is a list of the titles of occupations in which at least one job opening is projected for 1982.

Column 2: Total Job Openings, 1982 - Number These are the total numbers of jobs expected to be open for Oregon workers in each occupation or group of occupations in 1982, either because of growth in the employing industries or because of present workers leaving the labor force. It is the sum of columns 5 and 6.

Column 3: Total Job Openings, 1982 - Percent of Total This percentage represents the proportion of Oregon's total number of 1982 job openings that are expected to occur in each occupation or group of occupations. It is derived by dividing the number of job openings for each occupation in column 2 by the total number of job openings for all occupations at the top of column 2.

Column 4: Total Job Openings, 1982 - Percent of Employment This percentage represents the proportion of all the jobs in a certain occupation or group of occupations in 1982 expected to become open for new employees in that year. To arrive at this figure, the number of job openings from column 2 in each occupation or group of occupations is divided by the estimated 1982 employment in that occupation (from column 4 of Table 1).

Column 5: Openings Due to Growth The numbers of new jobs estimated to open for each occupation in 1982 due to growth in the employing industries are listed in this column. Openings due to growth are estimated by taking one-eighth of the projected change in employment from 1979 to 1987 (column 10 of Table 1). This estimate is negative for several occupations related to the timber industry.

Column 6: Openings Due to Labor Force Separations The number of job openings expected to occur in each occupation due to vacancies created by workers leaving the labor force during the year 1982 is listed in this column. National statistics on working life and mortality by the ages and sex of workers are applied to the numbers of men and women of different ages in each occupation in Oregon, to arrive at the numbers of workers likely to leave their jobs in 1982 for each occupation. The

DEPARTMENT OF EDUCATION
700 Pringle Parkway SE
Salem, Oregon 97310

Division of Vocational Education
Vocational Program Section

Apprentice Curriculum Materials Development Procedures

Phase I

1. State advisory committee and state vocational education staff identify curriculum materials needed.

2. Determine occupations for analysis.

   a. Request the State Apprenticeship and Training Division to notify joint committees of the intent to develop curriculum for their occupation and to call a meeting to determine a course of action and establish a state committee if appropriate.

   b. Preview any existing analyses.

3. Complete job analyses on occupation(s) selected following Department of Education format and system.

   a. Have analyses reviewed by appropriate personnel.

   b. Verify with actual workers.

4. Complete instructional analysis from task inventories including defining program and career goals.

5. Search for available materials.

6. Make determination of how available materials can be used (as is, modified, etc.) in meeting program and course goals.

7. Determine what curriculum development work must be done to complete the curriculum project in the ILS format. (List of modules, etc.)

8. Prepare estimate of money needed to complete project - writers, editing, graphics, committee involvement and camera ready copy - following department specified format.

Phase II

1. Prepare needed modules.

2. Prepare instructors guide.

3. Prepare recordkeeping system (cards, etc.).

4. Organize filing system.

5. Modify as needed "already available" curriculum materials.

6. Provide publicity brochure.

Adopted June 3, 1982 by the Apprentice Related Training Advisory Committee, Oregon Board of Education

APPENDIX B

Background Material on Task Inventory

Industrial References

1. Design Group, Inc.
   5875 Lakeview Blvd.
   Lake Oswego, OR 97223

2. Tom Boden Store Fixtures
   8900 N.E. Vancouver Way
   Portland, OR 97211

3. Desch Woodworking
   2820 S.E. 8th
   Portland, OR 97202

4. Mt. Hood Woodworking
   835 N. E. 8th St.
   Gresham, OR 97030

5. Specialty Woodworking Co., Inc.
   1434 N.W. 22nd Ave.
   Portland, OR 97201

6. Charles Grant Company
   5300 S. E. Johnson Creek Blvd.
   Portland, OR 97222

7. Alexander Manufacturing, Inc.
   802 S.E. 199th Ave.
   Portland, OR 97233

8. Don Nissan

9. Don Meyer

10. Santo Distifano

11. Dave Childs

Background Material on Task Inventory (Continued)

List of Models

1. Task Analysis for Carpenter

   Oregon Department of Education

   USOE Instructional Group Code 17.100100
   D.O.T. No. 860 381 026

2. Task Analysis Inventories, Series II

   U.S. Department of Labor

3. Cabinetmaker (A catalog of tasks, performance objectives, performance guides, tools, and equipment)

   Vocational-Technical Education Consortium of States (Developed by Tennessee 1981)

4. Business Data Processing
   Occupational Performance Survey

   The Ohio State University

   Research and Development Series No. 88

APPENDIX C

	NORTHWEST (except Eugene)	SOUTHWEST	NORTHEAST	SOUTHEAST
MILL 2431	15 Columbia Millwork, Inc. 1650 Salem Industrial Dr. Salem, OR 97303 6 Powell Door & Lumber Co. 3366 SE Powell Blvd. Portland, OR 97202 6 Blairs Woodworking 8930 NE Killingsworth Portland, OR 97220 30 Specialty Woodworking Co. 1434 NW 22 Portland, OR 97210	20 Nelson & Pyle Woodworking 868 SE Parrott Roseburg, OR 97470 20 Empire Pacific Industries 836 Mason Way Medford, OR 97501 99 Empire Pacific Industries P. O. Box 336 Roseburg, OR 97470	136 Consolidated Pine, Inc. P. O. Box 428 Prineville, OR 97754	20 Oregon Woodwork Ltd. Foot S Columbia Bend, OR 97701 20 Henderson Millwork, Inc. 3007 Anderson Avenue Klamath Falls, OR 97601 50 Dame Lumber & Moulding Co. Klamath Falls Hwy. Box 471 Lakeview, OR 97630
CABINETS 2434 OFFICE FURNITURE 2521 OFFICE & STORE FIXTURES 2541	3 Built-Rite Upholstery Products, Inc. 3149 NE Sandy Blvd. Portland, OR 97232 12 Starlite Cabinet & Construction 2840 NE Riverside Way Portland, OR 97211 5 J. O. Olsen Mfg. Co. 41 Danebo Ave., N Eugene, OR 97402 4 Sunset Cabinet & Fixtures, Inc. 11093 SW Industrial Way Tualatin, OR 97062 26 Images Woodworking, Inc. 8440 SW Warm Springs Street Tualatin, OR 97222 60 Boden Store Fixtures, Inc. 8900 NE Vancouver Way Portland, OR 97211 65 Design Group, Inc. 5875 SW Lakeview Blvd. Lake Oswego, OR 97034 6 Mt. Hood Woodworking 835 NE 8th St. P.O. Box 854 Gresham, OR 97030 7 Brunkow Cabinet Const. Co. 6411 SE Crosswhite Way Portland, OR 97206 8 R. W. Desch Woodworking 2020 SE 8th Portland, OR 97202 10 Top Line Fixtures 3207 SW 1st Avenue Portland, OR 97301 10 Stadler-Sorg Fixture Co. 14865 SW 72 Avenue Tigard, OR 97223 12 Salem Wood Products, Inc. 1740 23rd St., SE Salem, OR 97302 Charles Grant Co. 5300 SE Johnson Creek Blvd Milwaukie, OR 97222 60 Alexander Mfg., Inc. 802 SE 199 Avenue Portland, OR 97233 [illegible] Diamond Cabinets 630 SW Maple Hillsboro, OR 97123	9 Lamco Industries 1612 Sherman North Bend, OR 97459 The Oregon Cabinet Co. 932 SE "M" Street Grants Pass, OR 97526 -- 10 Wood Specialties, Inc. 465 N. 1st P.O. Box 457 Creswell, OR 97426 10 Lanz Cabinet Shop, Inc. 2275 South Louis Lane Eugene, OR 97405 120 Diamond Cabinets 550 SE Mill St. Grants Pass, OR 97526		
WOOD CONTAINERS 2449 WOOD PRODUCTS 2499 FURNITURE, HOUSEHOLD 2511	9 Designed Wood Products 970 Hwy. 99 E Hubbard, OR 97032 6 Valley Mfg. Co. 211 First St. Woodburn, OR 97071 25 Dura-Craft, Inc. P. O. Box 438 Newberg, OR 97132 60 National Tank & Pipe Co. 10037 SE Mather Rd. Box 7 Clackamas, OR 97015	8 Edigers Church Furniture 915 N. Main St. Independence, OR 97351 9 Myrtle Craft Studio 1785 Dowell Road Grants Pass, OR 97526 10 Oregon Myrtlewood Factory P. O. Box 603 Bandon, OR 97411 15 Guild Craft Products, Inc. Box 1065 Eugene, OR 97440 60 Bayview Mfg. Co. 3955 Coast Hwy. 101 North Bend, OR 97459 60 Parsons Pine Products, Inc P.O. Box 670, 363 Helman St Ashland, OR 97520	510 Harris Pine Mills 2203 SW Court Pendleton, OR 97801	

BEST COPY AVAILABLE

PORTLAND MILLMEN & CABINETMAKERS J.A.T.C.
2828 S.W. Corbett
Portland, Oregon 97201
Room 122

Apprenticeship Training Council

Dear Sir:

The results of the training survey of March 3, 1983 showed the need to develop a curriculum for a cabinetmaker and woodworker program. The Joint Apprenticeship and Training Committee for Millmen and Cabinetmakers is charged with the development of a curriculum for this program. The curriculum will be based on a task inventory of jobs in the cabinetmaking and woodworking industry.

Burr and Ada Fancher of Albany, Oregon have been contracted to conduct the task inventory. They will be contacting you on behalf of the Joint Apprenticeship Council before October 15.

Essentially, Burr and Ada will be asking your cooperation by allowing your employees to respond to the task checklist. Also, we would like to have you, as a manager, to respond to a short questionnaire on the general field of cabinetmaking and woodworking.

We hope to develop a quality curriculum based on a modular program. The task inventory will identify the content of those modules.

The Joint Apprenticeship Council will appreciate your cooperation with the task inventory and the general information on the manager survey.

Sincerely,

PORTLAND MILLMEN & CABINETMAKERS J.A.T.C.

David P. Rasmussen
Committee Member

Dear Employer,

Thank you for your willingness to cooperate in the task inventory. It is the most practical way to develop training packages that we have found.

The colored copy is to be completed by the owner or manager of the firm. The white copies are for your employees. When the inventories are completed, you can either return them as a group or individually. Individual mail-back envelopes are included for each checklist.

I have included a gift pen for each person that will be responding to the checklist. This is a small token of appreciation from the JATC for your help.

Once again, thanks for your assistance.

Sincerely,

Burr Fancher

BURR FANCHER

RESPONSE SUMMARY

CABINET MAKING SURVEY

RESPONDENTS: Sample Groups and Sample Numbers

A — 15, 19, 20

B -- 1, 3, 4, 7, 16, 24, 25, 28, 29, 32

C — 5, 12, 18, 23

SUMMARY OF RETURNS

GROUP	NUMBER FIRMS	MANAGEMENT SURVEYS	EMPLOYEE SURVEYS
A	3	3	10
B	10	10	45
C	4	4	25
TOTALS	17	17	80

LATE RESPONDENTS; A 31
B 2, 30

Plus the one that you have (#8, I believe). These are not in the summary.

NON-RESPONDENTS: A 17
B 8, 9, 13, 14, 26, 17
C 6, 10, 11, 21, 22

PORTLAND MILLMEN AND CABINET MAKERS

JATC

SAMPLE SUMMARY

SAMPLE NO.	EMPLOYER NAME	NO. SENT		NO. RECEIVED	
		Mt.	Emp.	Mt.	Emp.
1	Images Woodworking, Inc. 8490 S.W. Warm Springs Street Tualatin, OR 97062 Allen Kullgren: 692-0222	1	5	1	4
2	Sunset Cabinet & Fixtures, Inc. 11085 S.W. Industrial Way Tualatin, OR 97062 Tom Peterson: 692-3333	1	4	1	2
3	J. O. Olsen Manufacturing 41 Danebo Avenue, N Eugene, OR 97402 Marlin Olsen: 689-1331	1	4	1	4
4	Alexander Manufacturing, Inc. 802 S.E. 199 avenue Portland, OR 97233 Gaylen Gundersen: 666-9491	1	10	1	7
5	Guild Craft Products, Inc. Box 1065 Eugene, OR 97440 Richard Hindman: 345-5825	1	4	1	4
6	Parsons Pine Products, Inc. P.O. Box 670 363 Helman St. Ashland, OR 97520 Terry Brimhall: 482-3546	1	20		
7	Design Group, Inc. 5875 Lakeview Blvd. Lake Oswego, OR 97034 Harry W. Weitzer: 639-9636	1	10	1	4

SAMPLE SUMMARY

SAMPLE NO.	EMPLOYER NAME	NO. SENT Mt.	NO. SENT Emp.	NO. RECEIVED Mt.	NO. RECEIVED Emp.
8	Tom Boden Store Fixtures 8900 N.E. Vancouver Way Portland, OR 97211 Frank Zell: 285-1923	1	10	1	?
9	Lamco Industries 1612 Sherman North Bend, OR 97459 Mike Erbele: 756-6334	1	2		
10	~~Valley Manufacturing Co.~~ ~~211 First St.~~ ~~Woodburn, OR 97071~~ ~~Stewart Roberts: 982-1271~~ SUBSTITUTE: Henderson Millwork 3007 Anderson Ave. Klamath Falls, OR 97601 Elbert Henderson	1	18	First Sample: Returned, Material does not apply to their operation. Substitute Sample:	
11	Oregon Myrtlewood Factory P.O. Box 603 Bandon, OR 97411 R.H. Tuck: 347-2500	1	3		
12	Edigers Church Furniture 915 N. Main St. Independence, OR 97351 Don Ediger: 838-0583	1	5	1	~~5~~ 4
13	Diamond Cabinets 630 S.W. Maple Hillsboro, OR 97123 Dick Curren: 648-3104	1	2		
14	Lanz Cabinet Shop, Inc. 2275 South Louis Lane Eugene, OR 97405 Mailed to: Lanz Cabinets Rt. 923 Kevin Rd. Midland, Texas 79703 Darrel Lanz: 485-4050	1	2		
15	Blairs Woodworking 8930 N.E. Killingsworth Portland, OR 97220 A. Hogue: 252-2425	1	4	1	2

SAMPLE SUMMARY

SAMPLE NO.	EMPLOYER NAME	NO. SENT		NO. RECEIVED	
		Mt.	Emp.	Mt.	Emp.
16	Brunkow Cabinet Construction 6411 S.E. Crosswhite Way Portland, OR 97206 Bud Brunkow: 777-2261	1	3	1	2
17	Nelson & Pyle Woodworking 868 S.E. Parrott Roseburg, OR 97470 Steve Pyle: 673-3434	1	10		
18	~~Dura-Craft, Inc.~~ ~~P.O. Box 438~~ ~~Newberg, OR 97132~~ ~~Milo Chapman: 538-3136~~ SUBSTITUTE SAMPLE: Columbia Millwork Inc. 1650 Salem Industrial Drive Salem, OR 97303 Ron Johnson	1	13	First Sample: Returned, not interested Substitute Sample: 1	13
19	Dame Lumber & Moulding Co. Klamath Falls Highway Box 471 Lakeview, OR 97630 Tom Stoddard: 947-4044	1	10	1	8
20	Consolidated Pine, Inc. P.O. Box 428 Prineville, OR 97754 J.E. Garrett: 447-5635	1	2	1	
21	Harris Pine Mills 2203 S.W. Court Pendleton, OR 97801 Ray Watson: 276-1421	1	10		
22	National Tank & Pipe 10037 S.E. Mather Rd. Box 7 Clackamas, OR 97015 Marty Frey: 656-1991	1	10		
23	Bayview Manufacturing Co. 3955 Coast Highway 101 North Bend, OR 97459 Roger Clark: 756-2582	1	6	1	3

SAMPLE SUMMARY

SAMPLE NO.	EMPLOYER NAME	NO. SENT		NO. RECEIVED	
		Mt.	Emp.	Mt.	Emp.
24	Charles Grant Company 5300 S.E. Johnson Creek Blvd. Portland, OR 97222 Michael C. Grant: 777-2291	1	30	1	15
25	Top Line Fixtures 3207 S.W. 1st. Avenue Portland, OR 97201 J.P. Roberts: 223-9338	1	10	1	4
26	Stadler-Song Fixture Co. 14865 S.W. 72 Avenue Tigard, OR 97223 Norm Fords: 639-9515	1	10		
27	The Oregon Cabinet Company 932 S.E. "M" Street Grants Pass, OR 97526 Bob Biddings: 479-5422	1	4		
28	Wood Specialties, Inc. 465 N. 1st. Creswell, OR 97426 E.W. Arpin: 895-2278	1	1	1	1
29	Salem Wood Products, Inc. 1740 23rd. St., S.E. Salem, OR 97302 Don Koonce: 364-9772	1	12	1	3
30	R.W. Desch Woodworking 2820 S.E. 8th Portland, OR 97202 R.W. Desch: 238-5500	1	5	1	5
31	Specialty Woodworking Co. 1434 N.W. 22 Portland, OR 97210 Floyd Carson: 224-5465	1	10	1	5

SAMPLE SUMMARY

SAMPLE NO.	EMPLOYER NAME	NO. SENT Mt.	NO. SENT Emp.	NO. RECEIVED Mt.	NO. RECEIVED Emp.
32	Mt. Hood Woodworking 835 N.E. 8th St. P.O. Box 854 Gresham, OR 97030 R. J. Gross: 667-2220	1	1	1	1

	Mt.	Emp.
TOTALS IN SUMMARY	17	80
LATE RESPONSES:		
Burr has	3	12
David has		

SAMPLE CONTACTED, BUT UNABLE TO RESPOND:

Designed Wood Products 970 Highway 99E Hubbard, OR 97032 Frant McCormick: 981-8592	Closed down at this time. Unable to participate, no employees.
Diamond Cabinets 550 S.E. Mill St. Grants Pass, OR 97526 Bugs Dymock: 479-6616	Hillsboro factory is participating.
Empire Pacific Industries P.O. Box 336 Roseburg, OR 97470 679-6791	They referred me to Morry Greenstein, Portland office--620-1920. They are only a distribution center, no manufacturing.
Myrtle Craft Studio 1785 Dowell Road Grants Pass, OR 97526 James K. Cooke: 479-9371	He was not interested. He claimed they were too far away. I tried to convince him, but he was just not interested.
Built-Rite Upholstery Products, Inc. 3149 N.E. Sandy Boulevard Portland, OR 97232 Gene Hval: 236-7302	He claimed that they could not take part. End of conversation.
Starlite Cabinet & Construction 2840 N.E. Riverside Way Portland, OR 97211 Karl H. Sturm: 249-3813	They do not want to be involved.
Powell Door & Lumber Co. 3366 S.E. Powell Boulevard Portland, OR 97202 Richard Palumbo: 236-8414	They do no milling or cabinet work any more. He would respond, however, his employees are not working in this area.
Empire Pacific Industries 836 Mason Way Medford, OR 97501 Jim Vanek: 779-1981	Actually, Jim was not there. They have declared bankruptcy, everything is being auctioned.
Columbia Millwork, Inc. 1650 Salem Industrial Dr. Salem, OR 97303 Harold Johnson: 364-9535	Phoned on 9-30; 10-7; 10-14; no answer. Used as substitute for Sample #18
Oregon Woodwork Ltd. Foot S. W. Columbia Bend, OR 97701 Gertrude Morris: 382-2492	Phoned on 9-30; 10-7; 10-14; no answer.
Henderson Millwork, Inc. 3007 Anderson Avenue Klamath Falls, OR 97601 Elbert Henderson: 884-7337	Phoned on 9-30; 10-7; 10-14; no answer. Used as substitute for Sample #10

APPENDIX D

TASK INVENTORY SUMMARY
Employees-Cabinetmaking
1983

By Mean Value

TASK STATEMENT	GROUP A n=10	GROUP B n=45	GROUP C n=25	TOTAL n=80
PLANNING PROCESS				
Read architectural drawings	0	1.3	.4	.8
Read blueprints (detailed shop drawings)	.8	2.3	.7	1.6
Read drawings (sketches)	.9	1.9	1.5	1.7
Read material lists	1.1	2.1	1.8	1.9
Read job orders	.6	1.5	1.8	1.5
Use architectural scale	.2	1.2	.5	.9
Use math and geometry for layout	.2	1.6	1.2	1.3
Use math for cutting list, hours & job billing	.3	1.8	1.2	1.5
Make preliminary job site measurements	0	.7	.2	.5
Use various types of surveying equipment (water line/level, transit)	0	.4	.2	.3
Use ordinary drafting tools	.5	.6	.3	.5
Draw to scale	.6	.7	.3	.5
Draw in perspective	.2	.7	.4	.5
Sketch	.5	1.1	.5	.9
Determine materials	.7	1.5	1.4	1.4
Estimate your individual labor time	.4	1.5	1.4	1.3
SHOP PREPARATION PROCESS				
Lay out patterns	.8	1.3	.8	1.1
Lay out template	.7	1.4	.8	1.2
Make story pole (rod) layout	.4	1.5	.4	1.0
Mark cutting lines	.8	1.6	1.1	1.3
Measure materials with folding rule or pull-out tape	.8	2.8	2.0	2.3
Use 100 ft. tape	.5	.7	.1	.5
Mark angular & parallel lines with framing (rafter) square	.6	1.3	1.0	1.1

TASK STATEMENT	GROUP A	GROUP B	GROUP C	TOTAL
Use scriber, dividers, & trammel points to mark lines	.5	1.2	.6	.9
Use level	.5	1.8	.6	1.3
Establish long level lines	.5	.8	.4	.6
Establish long lines with chalk line	.5	1.0	.6	.8
Read story pole (rod) layout	.5	1.4	.2	.9
Train personnel in procedures	.8	1.5	1.0	1.3
DETERMINING TASKS & PROCEDURES				
Determine product layout & procedure	.6	1.4	1.5	1.3
Determine machine operation & sequence required	.7	1.5	1.4	1.5
Determine set-up of machines or equipment	1.5	1.6	1.4	1.5
Choose type of cutting head or woodworking tool required	1.2	1.7	1.8	1.6
Choose product assembly methods & procedures	.8	1.8	1.4	1.5
Mark product for job identification	1.0	1.8	1.3	1.5
Mark inter-related parts	.6	1.4	1.1	1.2
Mark product for part alignment	.7	1.2	.7	1.0
MATERIAL PROCESS				
Select sheet stock by grade	.7	1.2	.4	.9
Select lumber for size & identify species	1.1	1.7	1.7	1.6
Inspect for knots	1.5	1.7	1.9	1.7
Inspect for stain & color	1.4	1.5	1.5	1.5
Inspect for defective milling or planing	1.4	1.7	1.6	1.6
Inspect for crown and warp	1.0	1.9	1.5	1.6
Mill rough lumber to straight & square	.5	1.7	2.0	1.6

TASK STATEMENT	GROUP A	GROUP B	GROUP C	TOTAL
MATERIAL HANDLING				
Use fork lift	.7	1.1	1.4	1.1
Stack material for storage	1.2	1.1	1.4	1.2
Use factory trucks, 4-wheel dolly or hand truck to move materials	.8	1.6	2.0	1.7
Hand carry materials, rough or machined	1.4	1.6	2.0	1.7
QUALITY CONTROL				
Inspect products for mismatched grain	.8	1.5	1.1	1.3
Inspect for blemishes	1.3	1.7	1.6	1.6
Inspect product for loose joints	1.0	1.5	1.3	1.4
Inspect product for holes	1.1	1.6	1.7	1.6
Inspect product for splits	1.4	1.7	2.0	1.7
Inspect product for missing hardware	.5	1.3	.8	1.0
Inspect product for sharp edges	1.0	1.6	1.1	1.4
USE OF HAND TOOLS				
Clean and sharpen hand tools	.8	2.0	1.3	1.6
Use hole saw and swing cutters	.4	1.1	.7	.9
Use drill bits	1.1	2.1	1.4	1.6
Use chisels	.8	2.0	1.3	1.6
Use countersinks	.7	1.9	1.0	1.5
Use files	1.0	2.1	1.0	1.6
Use gouges	.1	.9	.4	.6
Use levels	.7	1.6	.5	1.2
Use block plane	.4	1.7	.9	1.3
Use jack plane	0	1.2	.4	.8
Use other planes (jointer plane, rabbet plane, bull-nose plane)	.1	1.3	.9	1.0

TASK STATEMENT	GROUP A	GROUP B	GROUP C	TOTAL
Use putty knife	.3	1.9	2.0	1.7
Use rasp	.1	1.1	.5	.8
Use scribers (dividers)	.5	1.4	.5	1.0
Use screwdrivers	1.4	1.9	1.3	1.7
Use vises	.8	1.3	1.2	1.2
Use wrenches	1.5	1.4	1.3	1.4
Use dovetail saw	.3	1.3	.4	.9
Use tenon saw	.2	.6	.4	.5
Use crosscut hand saw	.6	1.3	1,4	1.2
Use key hole saw	.2	.5	.3	.4
Use hack saw	.9	1.0	.6	.8
Use pinch dogs	.2	1.1	.2	.7
Use pry bar	.6	1.2	.6	.9
Use hand scrapers	.7	2.0	1.1	1.6
Use brace and bit	.2	.5	.3	.4
Use plumb bob	.1	.6	.3	.4
Use coping saw	.6	.6	.3	.5
Use dado cleaners	.2	1.2	.2	.7
Use nail set	.5	1.7	1.1	1.4
Use hand glue spreader	.4	1.0	1.0	.9
Other (specify)	.5	.2	.2	.2
HAND POWER TOOLS				
Use circle saw (skill saw)	.7	1.3	.8	1.1
Use router	.7	2,5	1.0	1.8
Use laminate router	.5	1.9	.4	1.3
Use jig saw	.3	1.7	1.0	1.3
Use variable speed reversing drill	.8	2.3	1.2	1.7
Use screw gun	.4	2.0	1.0	1.5
Use hand power planer	.3	.6	.3	.5

TASK STATEMENT	GROUP A	GROUP B	GROUP C	TOTAL
Use Butterly plastic seam router	.2	.7	.1	.5
Use reciprocating saw	.1	.7	.3	.5
Use belt sander	.8	2.1	1.8	1.8
Use orbital sander	.5	1.8	.8	1.3
Use spline cutter	.4	1.6	.4	1.1
Use pneumatic stapler	.6	2.3	1.6	1.9
HAND ASSEMBLY				
Match grain of inter-related parts	.2	1.8	1.2	1.4
Pre-assemble to determine fit	.5	2.0	1.3	1.6
Hand work part to specified fit	.4	1.7	1.2	1.4
Use urea resin glue (brown)	.4	1.4	1.0	1.2
Use white glue	.8	2.2	1.5	1.8
Use yellow glue	.6	1.4	1.1	1.2
Glue boards edge to edge	.3	1.5	1.8	1.4
Fasten parts together with glue only	.4	1.6	1.6	1.4
Fasten parts together with glue heating unit (wood welder)	0	1.1	.2	.6
Use clamps	.6	2.3	1.8	1.9
Select screws, staples, nails by size & type	.8	2.2	1.2	1.7
Fit and fasten parts together with nails	.7	1.6	1.2	1.4
Fit and fasten parts together with dowels	.3	1.3	.6	1.0
Fit and fasten parts together with splines	.4	1.7	.5	1.2
Fit and fasten parts together with screws	.9	1.9	1.0	1.5
Fit and fasten parts together with hinges	.4	1.4	.6	1.0
Fit and fasten parts together with pins	.6	.7	.5	.6
Fit and fasten parts together with staples	1.1	2.2	1.6	1.9
Fit and fasten parts together with bolts	1.0	1.3	.4	1.0
Spray contact cement	0	1.1	.6	.8
Roll contact cement	.5	1.9	.5	1.3

TASK STATEMENT	GROUP A	GROUP B	GROUP C	TOTAL
Cut and install plastic laminate	.4	2.1	.5	1.4
Fit plastic laminate joints	.3	1.9	.5	1.3
Apply wood edges	.6	1.8	.6	1.3
Attach hardware to complete assembly	.6	1.8	.9	1.4
Adjust moving parts (drawer guides, door hinges or roller) to obtain correct fit	.5	2.0	.6	1.4
Cut glass	.3	.5	.4	.4
Assemble glass into frames	.2	.7	.6	.6
MILL & MACHINE PROCESSES				
Use router templates	.2	2.0	.6	1.3
Use templates (jigs)	.5	2.0	1.1	1.5
Use clamps	.4	2.2	1.6	1.8
Use calipers	1.6	1.0	1.2	1.1
Use patterns	.6	1.2	1.4	1.2
Use straight edge	1.3	2.0	1.6	1.8
Cut material for size from cutting bill	.6	1.8	1.2	1.5
Cut material for size from layout or print	.8	1.9	1.3	1.6
Cut rabbet joint	.5	1.6	.9	1.2
Cut dado rabbet joint	.3	1.7	1.1	1.3
Cut lap joint	.1	.8	.7	.7
Cut mortise and tenon joint	.5	.7	.6	.6
Cut dowel joint	.2	1.0	.4	.7
Cut spline joint	.5	1.7	.4	1.2
Cut veneer joint	.1	.8	.3	.6
Cut veneer	0	1.0	.3	.7
Layout veneer matches	0	.7	.3	.5
Layout shaper or sticker knives	.6	.7	.5	.6
Grind or sharpen tools or knives for machine	.6	.6	.7	.6

TASK STATEMENT	GROUP A	GROUP B	GROUP C	TOTAL
Set cutter head or tool for prescribed operation	1.0	1.3	1.2	1.2
Make panel doors	.4	.8	.6	.7
Make solid core doors	.1	.5	.4	.4
Make windows	0	.5	.6	.5
Make window frames	.2	.6	.7	.6
Layout and construct stairs	.1	.3	.1	.2
Fit passage door hardware	.3	.7	.2	.5
STATIONARY EQUIPMENT				
Use variety table saw	.9	2.2	2.0	2.0
Use sliding table saw	.6	.8	.5	.7
Use panel saw	0	1.2	.2	.7
Use straight line rip saw	.6	1.0	1.4	1.1
Use band saw	.7	1.6	1.7	1.5
Use mitre saw	.5	1.7	.9	1.3
Use panel router	.6	1.2	.2	.8
Use table router	.4	1.6	.8	1.2
Use pin router	0	.7	.4	.5
Use drill press	.8	1.7	1.2	1.4
Use horizontal boring machine	0	.9	.7	.7
Use chisel mortiser	.4	.4	.4	.4
Use chain mortiser	.1	.2	.3	.2
Use drawer machine	.3	.7	0	.4
Use dovetail machine	.4	.5	.2	.4
Use jointer	.5	2.0	1.8	1.8
Use horizontal router jointer	.3	.7	.1	.4
Use thickness planer	.5	1.3	1.7	1.4
Use abrasive planer	.2	.8	.8	.7

TASK STATEMENT	GROUP A	GROUP B	GROUP C	TOTAL
Use single-spindle shaper	.4	1.2	1.2	1.1
Use double-spindle shaper	0	.3	.1	.2
Use tenoner	.5	.4	.4	.4
Use moulder (sticker)	0	.4	.9	.5
Use edge bander	0	.5	0	.3
Use jig saw	.5	1.3	.6	1.0
Use radial arm saw	.7	1.6	1.8	1.5
Use lathe	.1	.3	.4	.3
Use veneer tapers	0	.3	0	.2
Use veneer press	0	.4	.1	.2
Use veneer cutter	0	.4	0	.2
Use contour sander	0	.5	.4	.4
Use disc sander	.4	1.2	.6	.9
Use cylinder sander	0	.6	.3	.4
Use drum sander	.5	.9	1.2	.9
Use manual stroke sander	.7	1.2	1.1	1.1
Use automatic stroke sander	0	.5	.4	.4
Use bench grinder	.6	1.2	.8	1.0
Other (specify) Defect Chop Saw, Saw Grinder	1.1	.1	.2	.2
INSTALLATION				
Hang panelling	.2	.7	.3	.5
Install finish carpentry	.2	1.0	.4	.7
Use powder actuated tools	.1	.8	.4	.6
Work with other trades to install cabinetwork	.2	.9	.4	.6
Hang passage doors	.2	.5	.2	.3

TASK STATEMENT	GROUP A	GROUP B	GROUP C	TOTAL
FINISH PREPARATION & FINISH WORK				
Inspect for glue spots	.2	1.8	1.2	1.4
Inspect for scratches that would show in finish	.2	2.1	1.6	1.7
Hand fashion patches	.2	1.1	.6	.8
Fill wood cracks or dents with filler	.2	1.7	2.0	1.6
Sand to prepare for finish	.6	2.2	1.8	1.9
Steam dents	.2	1.2	.4	.8
Wipe stain	.2	1.0	.8	.9
Spray stain	0	.7	.5	.5
Spray finishes	0	.7	.7	.6
Roll paint	.3	.4	.4	.4
Use airless spray gun	.2	.2	.6	.3
Use cop spray gun	0	.3	.2	.2
Use pressure pot spray gun	0	.5	.5	.4

RELATED INFORMATION

Were you an apprentice? Yes-30 No--39 If so, where? See Attached List

Background training you feel has helped you in this trade:

	Field Training	School Training
Drafting	11	30
Business	7	6
Math	7	35
Furniture Building	23	6
Design	16	8
Others Woodworking/MBA degree	2	2

TASK INVENTORY SUMMARY
In Descending Order of Importance
Employees-Cabinetmaking
1983

By Mean Value

TASK STATEMENT	GROUP A	GROUP B	GROUP C	TOTAL
Measure materials with folding rule or pull-out tape	.8	2.8	2.0	2.3
Use variety table saw	.9	2.2	2.0	2.0
Use pneumatic stapler	.6	2.3	1.6	1.9
Use clamps	.6	2.3	1.8	1.9
Fit and fasten parts together with staples	1.1	2.2	1.6	1.9
Sand to prepare for finish	.6	2.2	1.8	1.9
Read material lists	1.1	2.1	1.8	1.9
Use router	.7	2.5	1.0	1.8
Use white glue	.8	2.2	1.5	1.8
Use clamps	.4	2.2	1.6	1.8
Use belt sander	.8	2.1	1.8	1.8
Use straight edge	1.3	2.0	1.6	1.8
Use jointer	.5	2.0	1.8	1.8
Use variable speed reversing drill	.8	2.3	1.2	1.7
Select screws, staples, nails by size & type	.8	2.2	1.2	1.7
Inspect for scratches that would show in finish	.2	2.1	1.6	1.7
Use putty knife	.3	1.9	2.0	1.7
Read drawings (sketches)	.9	1.9	1.5	1.7
Use screwdrivers	1.4	1.9	1.3	1.7
Inspect product for splits	1.4	1.7	2.0	1.7
Inspect for knots	1.5	1.7	1.9	1.7
Hand carry materials, rough or machined	1.4	1.6	2.0	1.7
Use factory trucks, 4-wheel dolly or hand truck to move materials	.8	1.6	2.0	1.7
Read blueprints (detailed shop drawings)	.8	2.3	.7	1.6
Use files	1.0	2.1	1.0	1.6
Use drill bits	1.1	2.1	1.4	1.6
Clean and sharpen hand tools	.8	2.0	1.3	1.6
Use chisels	.8	2.0	1.3	1.6
Pre-assemble to determine fit	.5	2.0	1.3	1.6
Use hand scrapers	.7	2.0	1.1	1.6
Inspect for crown and warp	1.0	1.9	1.5	1.6
Cut material for size from layout or print	.8	1.9	1.3	1.6
Fill wood cracks or dents with filler	.2	1.7	2.0	1.6
Choose type of cutting head or woodworking tool required	1.2	1.7	1.8	1.6
Select lumber for size & identify species	1.1	1.7	1.7	1.6
Inspect for defective milling or planing	1.4	1.7	1.6	1.6
Mill rough lumber to straight & square	.5	1.7	2.0	1.6
Inspect for blemishes	1.3	1.7	1.6	1.6
Inspect product for holes	1.1	1.6	1.7	1.6
Use templates (jigs)	.5	2.0	1.1	1.5
Use screw gun	.4	2.0	1.0	1.5
Use countersinks	.7	1.9	1.0	1.5

TASK INVENTORY SUMMARY
In Descending Order of Importance
Employees-Cabinetmaking
1983

By Mean Value

TASK STATEMENT	GROUP A	GROUP B	GROUP C	TOTAL
Fif and fasten parts together with screws	.9	1.9	1.0	1.5
Mark product for job identification	1.0	1.8	1.3	1.5
Chose product assembly methods & procedures	.8	1.8	1.4	1.5
Use math for cutting list, hours & job billing	.3	1.8	1.2	1.5
Read job orders	.6	1.5	1.8	1.5
Cut material for size from cutting bill	.6	1.8	1.2	1.5
Use band saw	.7	1.6	1.7	1.5
Use radial arm saw	.7	1.6	1.8	1.5
Determine set-up of machines or equipment	1.5	1.6	1.4	1.5
Determine machine operation & sequence required	.7	1.5	1.4	1.5
Inspect for stain & color	1.4	1.5	1.5	1.5
Cut and install plastic laminate	.4	2.1	.5	1.4
Adjust moving parts (drawer guides, door hinges or roller) to obtain correct fit	.5	2.0	.6	1.4
Match grain of inter-related parts	.2	1.8	1.2	1.4
Inspect for glue spots	.2	1.8	1.2	1.4
Attach hardware to complete assembly	.6	1.8	.9	1.4
Use drill press	.8	1.7	1.2	1.4
Hand work part to specified fit	.4	1.7	1.2	1.4
Use nail set	.5	1.7	1.1	1.4
Fasten parts together with glue only	.4	1.6	1.6	1.4
Inspect product for sharp edges	1.0	1.6	1.1	1.4
Glue boards edge to edge	.3	1.5	1.8	1.4
Determine materials	.7	1.5	1.4	1.4
Inspect product for loose joints	1.0	1.5	1.3	1.4
Use wrenches	1.5	1.4	1.3	1.4
Use thickness planer	.5	1.3	1.7	1.4
Fit and fasten parts together with nails	.7	1.6	1.2	1.4
Use router templates	.2	2.0	.6	1.3
Fit plastic laminate joints	.3	1.9	.5	1.3
Use laminate router	.5	1.9	.4	1.3
Roll contact cement	.5	1.9	.5	1.3
Use orbital sander	.5	1.8	.8	1.3
Apply wood edges	.6	1.8	.6	1.3
Use level	.5	1.8	.6	1.3
Cut dado rabbet joint	.3	1.7	1.1	1.3
Use jig saw	.3	1.7	1.0	1.3
Use mitre saw	.5	1.7	.9	1.3
Use block plane	.4	1.7	.9	1.3
Use math and geometry for layout	.2	1.6	1.2	1.3
Mark cutting lines	.8	1.6	1.1	1.3
Estimate your individual labor time	.4	1.5	1.4	1.3
Inspect products for mismatched grain	.8	1.5	1.1	1.3
Train personnel in procedures	.8	1.5	1.0	1.3
Determine product layout & procedure	.6	1.4	1.5	1.3
Cut spline joint	.5	1.7	.4	1.2

TASK INVENTORY SUMMARY
In Descending Order of Importance
Employees-Cabinetmaking
1983
By Mean Value

TASK STATEMENT	GROUP A	GROUP B	GROUP C	TOTAL
Fit and fasten parts together with splines	.4	1.7	.5	1.2
Cut rabbet joint	.5	1.6	.9	1.2
Use table router	.4	1.6	.8	1.2
Use levels	.7	1.6	.5	1.2
Use yellow glue	.6	1.4	1.1	1.2
Mark inter-related parts	.6	1.4	1.1	1.2
Use urea resin glue (brown)	.4	1.4	1.0	1.2
Lay out template	.7	1.4	.8	1.2
Use crosscut hand saw	.6	1.3	1.4	1.2
Set cutter head or tool for prescribed operation	1.0	1.3	1.2	1.2
Use vises	.8	1.3	1.2	1.2
Use patterns	.6	1.2	1.4	1.2
Stack material for storage	1.2	1.1	1.4	1.2
Use spline cutter	.4	1.6	.4	1.1
Mark angular & parallel lines with framing (rafter) square	.6	1.3	1.0	1.1
Use circle saw (skill saw)	.7	1.3	.8	1.1
Lay out patterns	.8	1.3	.8	1.1
Use single-spindle shaper	.4	1.2	1.2	1.1
Use manual stroke sander	.7	1.2	1.1	1.1
Use fork lift	.7	1.1	1.4	1.1
Use straight line rip saw	.6	1.0	1.4	1.1
Use calipers	1.6	1.0	1.2	1.1
Make story pole (rod) layout	.4	1.5	.4	1.0
Fit and fasten parts together with hinges	.4	1.4	.6	1.0
Use scribers (dividers)	.5	1.4	.5	1.0
Use other planes (jointer plane, rabbet plane, bull-nose plane)	.1	1.3	.9	1.0
Inspect product for missing hardware	.5	1.3	.8	1.0
Fit and fasten parts together with bolts	1.0	1.3	.4	1.0
Fit and fasten parts together with dowels	.3	1.3	.6	1.0
Use jig saw	.5	1.3	.6	1.0
Use bench grinder	.6	1.2	.8	1.0
Mark product for part alignment	.7	1.2	.7	1.0
Read story pole (rod) layout	.5	1.4	.2	.9
Use dovetail saw	.3	1.3	.4	.9
Use pry bar	.6	1.2	.6	.9
Use disc sander	.4	1.2	.6	.9
Use scriber, dividers, & trammel points to mark lines	.5	1.2	.6	.9
Use architectural scale	.2	1.2	.5	.9
Select sheet stock by grade	.7	1.2	.4	.9
Use hole saw and swing cutters	.4	1.1	.7	.9
Sketch	.5	1.1	.5	.9
Use hand glue spreader	.4	1.0	1.0	.9

TASK INVENTORY SUMMARY
In Descending Order of Importance
Employees-Cabinetmaking
1983

By Mean Value

TASK STATEMENT	GROUP A	GROUP B	GROUP C	TOTAL
Wipe stain	.2	1.0	.8	.9
Use drum sander	.5	.9	1.2	.9
Read architectural drawings	0	1.3	.4	.8
Use panel router	.6	1.2	.2	.8
Steam dents	.2	1.2	.4	.8
Use jack plane	0	1.2	.4	.8
Spray contact cement	0	1.1	.6	.8
Use rasp	.1	1.1	.5	.8
Hand fashion patches	.2	1.1	.6	.8
Establish long lines with chalk line	.5	1.0	.6	.8
Use hack saw	.9	1.0	.6	.8
Use dado cleaners	.2	1.2	.2	.7
Use panel saw	0	1.2	.2	.7
Use pinch dogs	.2	1.1	.2	.7
Install finish carpentry	.2	1.0	.4	.7
Cut dowel joint	.2	1.0	.4	.7
Cut veneer	0	1.0	.3	.7
Use horizontal boring machine	0	.9	.7	.7
Use sliding table saw	.6	.8	.5	.7
Cut lap joint	.1	.8	.7	.7
Use abrasive planer	.2	.8	.8	.7
Make panel doors	.4	.8	.6	.7
Fasten parts together with glue heating unit (wood welder)	0	1.1	.2	.6
Work with other trades to install cabinetwork	.2	.9	.4	.6
Use gouges	.1	.9	.4	.6
Establish long level lines	.5	.8	.4	.6
Use powder actuated tools	.1	.8	.4	.6
Cut veneer joint	.1	.8	.3	.6
Layout shaper or sticker knives	.6	.7	.5	.6
Fit and fasten parts together with pins	.6	.7	.5	.6
Spray finishes	0	.7	.7	.6
Assemble glass into frames	.2	.7	.6	.6
Cut mortise and tenon joint	.5	.7	.6	.6
Make window frames	.2	.6	.7	.6
Grind or sharpen tools or knives for machine	.6	.6	.7	.6
Draw to scale	.6	.7	.3	.5
Use 100 ft. tape	.5	.7	.1	.5
Draw in perspective	.2	.7	.4	.5
Fit passage door hardware	.3	.7	.2	.5
Use pin router	0	.7	.4	.5
Spray stain	0	.7	.5	.5
Hang paneling	.2	.7	.3	.5
Use reciprocating saw	.1	.7	.3	.5
Layout veneer matches	0	.7	.3	.5

TASK INVENTORY SUMMARY
In Descending Order of Importance
Employees-Cabinetmaking
1983

By Mean Value

TASK STATEMENT	GROUP A	GROUP B	GROUP C	TOTAL
Make preliminary job site measurements	0	.7	.2	.5
Use Butterly plastic seam router	.2	.7	.1	.5
Use coping saw	.6	.6	.3	.5
Use tenon saw	.2	.6	.4	.5
Use ordinary drafting tools	.5	.6	.3	.5
Use hand power planer	.3	.6	.3	.5
Make windows	0	.5	.6	.5
Use moulder (sticker)	0	.4	.9	.5
Use horizontal router jointer	.3	.7	.1	.4
Use drawer machine	.3	.7	0	.4
Use plumb bob	.1	.6	.3	.4
Use cylinder sander	0	.6	.3	.4
Cut glass	.3	.5	.4	.4
Use key hole saw	.2	.5	.3	.4
Use brace and bit	.2	.5	.3	.4
Use dovetail machine	.4	.5	.2	.4
Make solid core doors	.1	.5	.4	.4
Use automatic stroke sander	0	.5	.4	.4
Use contour sander	0	.5	.4	.4
Use pressure pot spray gun	0	.5	.5	.4
Use tenoner	.5	.4	.4	.4
Use chisel mortiser	.4	.4	.4	.4
Roll paint	.3	.4	.4	.4
Hang passage doors	.2	.5	.2	.3
Use edge bander	0	.5	0	.3
Use various types of surveying equipment (water line/level, transit)	0	.4	.2	.3
Use lathe	.1	.3	.4	.3
Use airless spray gun	.2	.2	.6	.3
Use veneer press	0	.4	.1	.2
Use veneer cutter	0	.4	0	.2
Layout and construct stairs	.1	.3	.1	.2
Use double-spindle shaper	0	.3	.1	.2
Use cop spray gun	0	.3	.2	.2
Use veneer tapers	0	.3	0	.2
Other (specify)	.5	.2	.2	.2
Use chain mortiser	.1	.2	.3	.2
Other (specify) Defect chop saw, saw	1.1	.1	.2	.2

TASK INVENTORY SUMMARY
MANAGEMENT SURVEY
CABINETMAKING
1983

SUMMARY BASED ON MEAN RATINGS

TASK STATEMENTS	GROUP A	GROUP B	GROUP C	TOTAL
WHAT DO YOU PRODUCE?				
Furniture	0	1.9	1.0	1.4
Bank Fixtures	.3	1.1	.2	.8
Store Fixtures	.3	1.1	.5	.8
Millwork	3.0	1.6	1.2	1.2
Doors & Windows	1.0	.9	1.0	.9
Display Cases	0	1.0	.7	.6
Kitchen Cabinets	.6	1.7	1.0	1.4
Other (specify) Mouldings, door & window frames	1.0	1.0	.7	1.1
WHAT PRODUCTION SYSTEM DO YOU USE?				
Single person or team start to finish	2.0	2.4	2.0	2.2
Line with classification (machine, assembly, finish)	1.0	1.5	2.5	1.4
Production Line	1.0	.3	0	.3

Task Statements	A	B	C	Total
Other (specify)	0	0	0	0
WHAT IS THE MAIN SYSTEM OF WORK COMMUNICATION IN YOUR PLANT?				
Word of Mouth	.7	1.4	.8	1.1
Work Orders & Cutting Bills	3.0	2.1	3.0	2.5
Architectural Drawings	1.0	1.5	.7	.9
Shop Drawings	1.0	2.7	1.2	2.0
Formal Sketches	0	.4	.2	.2
Sketches	.6	1.1	1.5	1.1
Rod or Panel Layouts	1.0	1.5	0	1.0
Other	0	0	0	0
WOULD IT HELP IF YOUR EMPLOYEES HAD KNOWLEDGE OF GENERAL BUSINESS PRINCIPLES AND SALES	2.3	1.0	2.0	1.8
WHAT MACHINERY IS USED IN YOUR PLANT?				
Sliding Table Saw	1.0	.9	1.5	1.1
Panel Saw	1.0	.9	0	.7
Variety Saw	.7	2.3	1.7	1.9
In Line Rip Saw	0	.9	1.7	.9
Band Saw	3.0	1.6	2.7	2.3

Task Statements	A	B	C	TOTAL
Miter Saw	1.0	1.6	2.0	1.6
Panel Router	1.0	.9	0	.7
Table Router	1.3	1.6	1.2	1.8
Pin Router	1.0	.8	1.5	1.0
Shaper	1.0	2.0	2.2	1.9
Moulder or Sticker	3.0	.6	1.2	1.4
Jointer	1.0	2.3	2.2	2.1
Planer	1.0	2.1	2.2	1.9
Mortiser	1.0	.2	1.0	.6
Boring Machine	1.0	1.0	1.7	1.1
Stroke Sander	1.0	1.0	1.7	1.1
Disc Sander	1.0	1.1	.2	.9
Edge Sander	1.0	1.8	1.7	1.6
Abrasive Planer	0	1.0	1.7	1.0
Edge Bander	.3	.6	0	.4
Veneer Equipment	0	0	0	0
Hand Router	1.0	2.6	1.2	1.9

Task Statements	A	B	C	TOTAL
Hand Circular Saw	.7	.9	.7	.9
Hand Jig Saw	.7	1.2	1.2	1.2
Hand Belt Sander	1.0	2.2	1.5	1.8
Orbital Sander	1.0	2.2	1.5	1.8
Air Nailers	1.0	2.7	2.5	2.3
Screw Guns	.7	1.7	1.7	1.4
Drill Press	1.0	1.9	1.7	2.2
Other (shadow line rip saw, defect saws, finger jointers, production moulding machines	1.0	.5	0	.3
AREAS OF KNOWLEDGE 7 SKILLS THAT YOUR EMPLOYEES HAVE THAT ARE IMPORTANT TO YOU				
Drafting	0	1.3	1.0	1.0
Print Reading	0	2.7	1.0	1.8
Estimating	0	1.2	.7	.9
Hardware	.3	2.0	1.0	1.5
Jig & Fixture Template Work	1.0	1.9	1.5	1.6
Use of Power Hand Tools	2.0	3.0	2.0	2.6
Business Sense	1.7	1.6	1.0	1.5

Task Statements	A	B	C	TOTAL
Knowledge of Materials	1.0	2.6	1.7	2.2
Machinery Maintenance & Care	2.0	2.4	2.2	2.3
Plastic Laminate Skill	1.0	2.9	1.0	2.1
Veneer Skill	0	.9	.7	.9
Machining	1.3	2.9	2.2	2.4
Job Measuring	1.0	2.0	1.0	1.4
Production Set Up	1.3	1.7	2.5	1.8
Architectural Door Casing hanging	1.0	.7	.2	.5
Architectural Paneling	0	.4	.2	.3
Metalwork	0	.7	.5	.5
Finish & Spray	0	1.6	2.0	1.4
Knowledge of Grain Matching	.7	1.9	1.5	1.5
Joint Construction	0	2.4	1.2	1.9
Knife Grinding	1.3	1.4	.7	1.2
Shaper or Moulder Work	1.0	2.1	1.7	1.6
Ability in Geometry for Layout	0	1.5	1.2	1.2

Task Statements	A	B	C	TOTAL
Laminating & Wood Bending	0	1.6	1.0	1.1
Safety Practices	3.0	3.0	2.7	2.9
First Aid Card	2.0	1.8	1.5	1.8
Hand Tools	1.7	3.0	2.5	2.3
Other (Supervisory Skills)	0	.3	0	.2
WHAT TYPES OF MATERIAL DO YOU USE?				
Glass	.7	.9	1.0	.9
Metal	0	.9	.5	.6
Acrylic Plastic	0	1.3	.5	.9
Plastic Laminate	1.0	2.6	1.0	1.9
Veneer	0	1.5	.7	1.1
Plywood	1.0	2.6	1.5	2.2
Composite Board	0	2.7	.7	1.8
Softwoods	3.0	2.5	1.2	2.3
Hardwoods	1.0	2.7	2.7	2.4
Other (specify)	0	.8	0	.5

TASK INVENTORY SUMMARY
In Descending Order of Importance
MANAGEMENT SURVEY
CABINETMAKING
1983

Summary based on mean ratings.

TASK STATEMENT	GROUP A	GROUP B	GROUP C	TOTAL
WHAT DO YOU PRODUCE?				
Furniture	0	1.9	1.0	1.4
Kitchen cabinets	.6	1.7	1.0	1.4
Millwork	3.0	1.6	1.2	1.2
Other (specify) Mouldings, door & window frames	1.0	1.0	.7	1.1
Doors & windows	1.0	.9	1.0	.9
Store fixtures	.3	1.1	.5	.8
Bank fixtures	.3	1.1	.2	.8
Display cases	0	1.0	.7	.6
WHAT PRODUCTION SYSTEM DO YOU USE?				
Single person or team start to finish	2.0	2.4	2.0	2.2
Line with classification (machine, assembly, finish)	1.0	1.5	2.5	1.4
Production line	1.0	.3	0	.3
Other (specify)	0	0	0	0
WHAT IS THE MAIN SYSTEM OF WORK COMMUNICATION IN YOUR PLANT?				
Work orders & cutting bills	3.0	2.1	3.0	2.5
Shop drawings	1.0	2.7	1.2	2.0
Sketches	.6	1.1	1.5	1.1
Word of mouth	.7	1.4	.8	1.1
Rod or panel layouts	1.0	1.5	0	1.0
Architectural drawings	1.0	1.5	.7	.9
Formal sketches	0	.4	.2	.2
Other	0	0	0	0
WOULD IT HELP IF YOUR EMPLOYEES HAD KNOWLEDGE OF GENERAL BUSINESS PRINCIPLES AND SALES?	2.3	1.0	2.0	1.8
AREAS OF KNOWLEDGE - 7 SKILLS THAT YOUR EMPLOYEES HAVE THAT ARE IMPORTANT TO YOU.				
Safety practices	3.0	3.0	2.7	2.9
Use of power hand tools	2.0	3.0	2.0	2.6
Machining	1.3	2.9	2.2	2.4
Hand tools	1.7	3.0	2.5	2.3
Machinery maintenance & care	2.0	2.4	2.2	2.3
Knowledge of materials	1.0	2.6	1.7	2.2
Plastic laminate skill	1.0	2.9	1.0	2.1
Joint construction	0	2.4	1.2	1.9

TASK INVENTORY SUMMARY
In Descending Order of Importance
MANAGEMENT SURVEY
CABINETMAKING
1983

Summary based on mean ratings.

TASK STATEMENT	GROUP A	GROUP B	GROUP C	TOTAL
AREAS OF KNOWLEDGE (Continued)				
Print reading	0	2.7	1.0	1.8
First aid card	2.0	1.8	1.5	1.8
Production set up	1.3	1.7	2.5	1.8
Shaper or moulder work	1.0	2.1	1.7	1.6
Jig & fixture template work	1.0	1.9	1.5	1.6
Hardware	.3	2.0	1.0	1.5
Knowledge of grain matching	.7	1.9	1.5	1.5
Business sense	1.7	1.6	1.0	1.5
Job measuring	1.0	2.0	1.0	1.4
Finish & spray	0	1.6	2.0	1.4
Ability in geometry for layout	0	1.5	1.2	1.2
Knife grinding	1.3	1.4	.7	1.2
Laminating & wood bending	0	1.6	1.0	1.1
Drafting	0	1.3	1.0	1.0
Estimating	0	1.2	.7	.9
Veneer skill	0	.9	.7	.9
Architectural door casing hanging	1.0	.7	.2	.5
Metalwork	0	.7	.5	.5
Architectural paneling	0	.4	.2	.3
Other (supervisory skills)	0	.3	0	.2
WHAT MACHINERY IS USED IN YOUR PLANT?				
Air nailers	1.0	2.7	2.5	2.3
Band saw	3.0	1.6	2.7	2.3
Drill press	1.0	1.9	1.7	2.2
Jointer	1.0	2.3	2.2	2.1
Hand router	1.0	2.6	1.2	1.9
Variety saw	.7	2.3	1.7	1.9
Planer	1.0	2.1	2.2	1.9
Shaper	1.0	2.0	2.2	1.9
Hand belt sander	1.0	2.2	1.5	1.8
Orbital sander	1.0	2.2	1.5	1.8
Table router	1.3	1.6	1.2	1.8
Edge sander	1.0	1.8	1.7	1.6
Miter saw	1.0	1.6	2.0	1.6
Screw guns	.7	1.7	1.7	1.4
Moulder or sticker	3.0	.6	1.2	1.4
Hand jig saw	.7	1.2	1.2	1.2
Stroke sander	1.0	1.0	1.7	1.1
Boring machine	1.0	1.0	1.7	1.1
Sliding table saw	1.0	.9	1.5	1.1
Abrasive planer	0	1.0	1.7	1.0

TASK INVENTORY SUMMARY
In Descending Order of Importance
MANAGEMENT SURVEY
CABINETMAKING
1983

Summary based on mean ratings.

TASK STATEMENT	GROUP A	GROUP B	GROUP C	TOTAL
MACHINERY USED IN PLANT (Continued)				
Abrasive planer	0	1.0	1.7	1.0
Pin router	1.0	.8	1.5	1.0
Disc sander	1.0	1.1	.2	.9
Hand circular saw	.7	.9	.7	.9
In line rip saw	0	.9	1.7	.9
Panel saw	1.0	.9	0	.7
Panel router	1.0	.9	0	.7
Mortiser	1.0	.2	1.0	.6
Edge bander	.3	.6	0	.4
Other (shadow line rip saw, defect saws, finger jointers, production moulding machines	1.0	.5	0	.3
Veneer equipment	0	0	0	0
WHAT TYPES OF MATERIAL DO YOU USE?				
Hardwoods	1.0	2.7	2.7	2.4
Softwoods	3.0	2.5	1.2	2.3
Plywood	1.0	2.6	1.5	2.2
Plastic laminate	1.0	2.6	1.0	1.9
Composite board	0	2.7	.7	1.8
Veneer	0	1.5	.7	1.1
Acrylic plastic	0	1.3	.5	.9
Glass	.7	.9	1.0	.9
Metal	0	.9	.5	.6
Other (specify)	0	.8	0	.5

APPENDIX E

GORDON RICHARDS EMPLOYER INTERVIEW

Company Name: J.A.T.C. Training Program

Image:	Blueprint, jointer work, putty, computers
Sunset:	Q.C., blind nailing, matchwork clamping, bending, attitude, millwork, plastic laminate layout, safety, ask questions, wood technology, installation, critical work.
Boden:	Overall career opportunities, calculations, diversified skills.
Mt. Hood:	Blueprint, attitude, skill (basic).
Stadler-jorg:	Blueprint (shop drawings, layout, sketching), business cost, materials, common sense, finish work, staining, GOT, testing of joints, glue strength, fasteners.
Specialty Woodworking:	(Larry Scott, sticker work instructor), sash and door, cabinet geometry.
Top Line	Drws., sanding work, sandpaper tech., dress code, safety (noise level), stroke sander, belt sander.
Alexander:	Blueprint, hand tools, prefinish problems, team effort, layout work, Q.C. "would you buy it?"
Charlie Grant:	Veneer work (veneer classes), detail drawings, group effort.

COMPARATIVE OUTLINES

State Related Training & Outline

Sketching and drawing
Blueprint reading
Math
Identification of materials
Estimate and layout
Elements of cabinetmaking
Instructions related to other trades
Safety practices
First aid
Labor relations

OJT in Order of Importance

General cabinet and bench assembly and layout
Jointer and variety saws
Frame layout and assembly
Plastic laminate and miscellaneous
Electric portable machines
Glue operations
Rip saw, cutoff saw, filing and stock room
Planers, sticker, and knife grinding
Drum, belt, and disc sanding
Shapers and routers
Band saw and resaws
Double and single end tennoning
Dowell pin machine

Breakdown of Other States Outline

37% Practical machinery & assembly
    Stairs, kitchens, millwork, power hand tools
21% Shop drawing
    Estimating, layout, design, job billing, blueprint reading, drafting,
10% Machinery stationary
7% Handtools
7% Math
5% Plastic laminate & wood laminate
5% Materials
5% Individual development
    History, apprenticeship requirements, occupational regulations, job and human relations, small business concepts
3% Finishing
3% Hardware
1% Safety
1% Joints

Old Portland Outline

I. Introduction
II. Table saws
III. Cabinet construction methods
IV. Hand tools
V. Machinery stationary
VI. Drafting print reading
VII. Materials
VIII. Finishing
IX. Power hand tools
X. Miscellaneous history & business
    Time & motion studies
    Business
    OSHA
    Math
    Safety

A. P. Wherry & Associates, Inc.
14600 Detroit Ave.
712 Lakewood Center North
Cleveland, OH 44107

Abrasives Marketing Group
Worcester, MA 01606

Adjustable Clamps Company
412 N. Ashland Ave.
Chicago, IL 60622

Alabama State Dept. of Education
Curriculum Dept. Unit, Room 802
Montgomery, AL 36130

American Hardboard Association
887-B Wilmette Road
Palatine, IL 60067

American National Standards Institute, Inc.
1430 Broadway
New York, NY 10018

American Technical Publications, Inc.
2235 S. Laramie Ave.
Alsip, IL 60658

American Vocational Association #131
2020 N. 14th St.
Arlington, VA 22201

Appalachian Hardwood Manufacturers, Inc.
P.O. Box 427
High Point, NC 27261

Apprenticeship Branch Offices
6th Floor, Alberta Place
1520 4th Street S.W.
Calgary, Canada
T2R 1H5

Architectural Woodwork Institute
2310 S. Walter Reed Dr.
Arlington, VA 22206

Behr-Manning Div. of The Norton Co.
1 New Bond St.
Worchester, MA 01606

Bennett IL
809 W. Detweiller Dr.
Peoria, IL 61615

Binks Manufacturing Co.
P.O. Box 66090
AMF O'Hare International Airport, IL 60666

Binks Manufacturing Co.
9201 W. Belmont Ave.
Franklin Park, ILL 60131

British Columbia Ministry of Labor
Attn: L. Weeteringen, Ministry of Labor
Program Development Section
Rm 120, 4946 Canada Way
Burnaby, BC
Canada
V5G4J6

Bruce Glencoe Publishing Co.
c/o Macmillian Pub. Co., Inc.
866 Third Ave.
New York, NY 10022

Buckinghamshire
College of Higher Educations
Attn: Dr. H. F. Reid
Queen Alexandra Rd.
High Wycombe HP112JZ

Building Crafts Training School
Attn: Director Terence Every
153 Great Titchfield St.
London, England W1P 7FR

Buss Machine Works
Ex-Cell-O Corp.
345 E. 48th St.
Holland, MI 49423

C. Clauser
P.O. Box 985
Philomath, OR 97370

C.O. Porter Machinery Co.
522 Plymouth Rd. N.E.
Grand Rapids, MI 49505

Canadian Wood Council
85 Albert Street
Ottawa, Ontario, Canada
K1P6A4

Carpenters Hall
Throgmorton Ave.
London EC2 England

Center for Occupational Curriculum Development
P.O. Box 7218
University of Texas at Austin
Austin, TX 78712

Chamber of Commerce of the U.S.
1615 H St. N.W.
Washington, D.C. 20062

Charles H. Day, Inc.
Attn: Larry Phillips
602 S.E. 11th Ave.
Portland, OR 97218

Charles Scribner's Sons
597 Fifth Ave.
New York, NY 10017

Chesterfield House - Suite A
5055 South Chesterfield Rd.
Arlington, VA 22206

Cincinnati Tool Company
Warren Tool Group
5901 Creek Road
Cincinnati, OH 45242

Cincinnati Tool Company
Cooper Group
P.O. Box 728 - Lufkin Rd.
Apex, NC 27502

CIP's Statistics
Attn: Nancy Hargis
Tel #378-8146

City and Guilds of London Instutute
76 Portland Place
London, England WIN4AA

Conserva, Inc.
1735 I Street, N.W. - Suite 805
Washington, DC 20006

Cyro Industries
Wayne, NJ 07470

Delmar Div. of Litton Educ. Pub. In.
50 Wolf Road
Albany, NY 12205

Delmar Div. of Litton Educ. Pub. In.
Attn: Bill Nameny
20191 Argonaut Dr.
Saratoga, CA 95070

Delta Communications, Inc.
Subscription Dept.
400 W. Michigan Ave. - Suite 1216
Chicago, IL 60611

Dept. of Education
Attn: Ralph Little
700 Pringle Parkway, S.E.
Salem, OR 97310

Diamond Tool and Horseshoe Co.
4702 Grand Ave.
P.O. Box 6246
Duluth, MN 55806

Disston, Inc.
P.O. Box 3000
Danville, VA 24543

Doubleday and Company, Inc.
Garden City, NY 11530

Dover Publications, Inc.
180 Varick
New York, NY 10014

Employment Statistics
Attn: Duane Stevenson
Employment Division, OPPS
Dept. of Human Resources
875 Union St. N.E.
Salem, OR 97311

Extension Instruction & Materials Center
Attn: Dr. Jack E. Robertson, Director
P.O. Box 7218
The University of Texas at Austin
Austin, TX 78712

Fachgemeinschaft
Holzbear Beitungs Maschinen
Im VDMAe.V.
Loyner Strabe 18, Postfach 710109
D-6000 Frankfurt/M-Niederrad 71
West Germany

Fachhochschule Rosenheim
Marienberger Str. 26
8200 Rosenheim
West Germany

Fine Hardwood American Walnut Assoc.
5603 W. Raymond - Suite O
Indianapolis, IN 46241

Forest Products Research Society
Circulation Dept.
2801 Marshall Court
Madison, WI 53705

Forest Product Lab
Forest Service USDA
P.O. Box 5130
Madison, WI 53705

Formica Corporation
10155 Reading Rd.
Cincinnati, OH 45241

Frank Paxton Co.
6311 St. John Ave.
Kansas City, MO 64123

Franklin Chemical Industries
2020 Bruck St.
P.O. Box 07802
Columbus, OH 43207

Furniture Makers
c/o G. Benbow Co.
Durbates, Wadhurst East Sussey
England

Furniture Production
804 Church St.
Nashville, TN 37203

Goodheart-Wilcox Co., Inc.
123 W. Taft Dr.
South Holland, IL 60473

Greenlee Tool Div.
2330 23rd Ave.
Rockford, IL 61101

H.P. Books
P.O. Box 5367
Tucson, AZ 85703

Harcourt Brace Jovanovich Publications
One East First St.
Duluth, MN 55806

Hardwood Dimension Manufacturers Assoc.
P.O. Box 15721
Nashville, TN 37215

Hardwood Plywood Manufacturers Assoc.
1825 Michael Faraday Dr.
P.O. Box 2789
Reston, WA 22090

Hoover Universal, Inc.
Furniture Components Group
Showalter Drive
Georgetown, KY 40324

Industrial Extension Service
Attn: Ms. Linda McRae, Film Library
2nd Floor - Page Hall
North Carolina State University
Raleigh, NC 27650

Institute of Paper Chemistry
1043 E. South River St.
Appleton, WI 54912

Instructional Materials Center
Main Building 2400
University of Texas - Austin
Austin, TX 78712

Instructional Materials Lab
Trade and Industrial Education
Ohio State University
Columbus, OH 43210

International Ideas, Inc.
1627 Spruce St.
Philadelphia, PA 19103

International Publication Service
114 E. 32nd St.
New York, NY 10016

L & L Machinery
Div. of Modern Globe, Inc.
P.O. Box 190
Shaver St.
North Wilkesboro, NC 28659

Lane Community College
Attn: Carl Horstrup
Tel #747-4501, ext. 2496

Librarian, Southeast Curriculum Coord. Network
P.O. Drawer DX
Mississippi State, MS 39762

Manpower
15th and M Street, N.W.
Washington, D.C. 20005

Manufacturers of America
1900 Arch Street
Philadelphia, PA 19103

Master Class
Stobart & Son, Ltd.
67-73 Worship Street
London EC2A2EL England

Mattison Machine Works
545 Blackhawk Park Ave.
Rockford, IL 61102

McGraw-Hill
1221 Avenue of the Americas
New York, NY 10020

McKnight-McKnight Publication Co.
808 IAA Drive
P.O. Box 2854B
Bloomington, IL 61701

Medic Publishing Co.
Drawer O
Issaquah, WA 98027

Mid-America Vocational Curriculum Consortium
Attn: Dr. Ann Benson
Stillwater, OK 74074

Milwaukee Area JATC
3020 W. Vliet St.
Milwaukee, WI 53208

Milwaukee Electric Tool
13135 West Lisbon Rd.
Brookfield, WI 53005

Milwaukee Tool and Equipment Co.
2773 S. 29th St.
P.O. Box 2039
Milwaukee, WI 53201

MIT Division
Attn: Gordon Richards
1800 E. McLoughlin
Vancouver, WA 98663

N. Carolina State University 2205
Hillsborough St.
Raleigh, NC 27607

Nat'l Network for Curriculum Coord. in Vocational
& Tech. Ed.
Attn: Barbara Luckner
Curriculum Search
Western Curriculum Coord. Ctr
Univ. of Hawaii
1776 University Ave.
Honolulu, HI 96844

National Association of Furniture Manufacturers
Attn: M. J. Ziokowski
5515 Security Lane - #550
Rockville, MD 20852

National Casein Co.
601 W. 80th
Chicago, IL 60620

National Forest Products Association
1619 Massachussetts Ave. N.W.
Washington, D.C. 20036

National Hardwood Lumber Assoc.
P.O. Box 34518
Memphis, TN 38184-0518

National Learning Corp.
212 Michael Drive
Syosset, NY 11791

National Paint and Coatings Assoc.
1500 Rhode Island Ave. N.W.
Washington, DC 20005

National Particleboard Assoc.
2306 Perkins Pl.
Silver Spring, MD 20910

National Safety Council
444 N. Michigan Ave.
Chicago, IL 60611

National Wood Carvers Association
P.O. Box 43218
7424 Miami Ave.
Cincinnati, OH 45243

National Woodwork Manufacturers Assoc., Inc.
20 S.W. Toughy Ave.
Park Ridge, IL 60068

New Jersey Vocational Technical Curriculum Lab.
Rutgers State University
4103 Kilmer Campus
New Brunswick, NJ 08903

Nicholson File Co.
Atkins Saw Div.
1825 N. Theobald
Greenville, MS 38701

Northwestern Vocational Curriculum Mgmt. Ctr.
Attn: Bill Daniels
Bldg. 17, Airdustrial Park
Olympia, WA 98504

Oliver Machinery Co.
102 S. Clancy Ave. N.W.
Grand Rapids, MI 49504

Ontario Furniture Manufacturers Association
Attn: George D. Sinclair, Marketing Services
6900 Airport Rd.
Mississauga, Ontario
Canada
L4V1E8

Oregon State University
Attn: Graduate Student
Tel #754-1313

OSU School of Education
Attn: Warren Suzuki
Vocational Technical Education Division
Corvallis, OR 97331

Pergamon Press, Inc.
Maxwell House
Fair View Park
Elmsford, NY 10523

Popular Mech. Press
Popular Lib., Inc.
Unit of CBS Publications
1515 Broadway
New York, NY 10036

Powermatic Houdaille, Inc.
P.O. Box 70
McMinnville, TN 37110

R. Sorsky Bookseller
3849 North Blackstone
Fresno, CA 93716

Reliance Universal, Inc.
1930 Bishop Lane
1600 Watterson Towers
Louisville, KY 40218

Rockwell International
Power Tool Division
4290 Raines Rd.
Memphis, TN 38118

S. E. Curriculum Coordination Network
P.O. Drawer DX
Mississipi State, MS 39762

School Shop
416 Longshore Drive
P.O. Box 8623
Ann Arbor, MI 48107

Simonds Cutting Tools Div.
Wallace Murray Corp.
Intervale Road
P.O. Box 500
Finchburg, MA 01420

Simonds Saw and Steel Co.
6500 N. E. Halsey St.
Portland, OR 97213

Southeast Curriculum Coordination Network
Mississippi State University
Research and Curriculum Unit
P.O. Drawer DX
Mississippi State, MS 39762

Southern Forest Products Assoc.
P.O. Box 52468
New Orleans, LA 70152

Southern Furniture Manufacturers Assoc.
P.O. Box 2436
High Point, NC 27261

Southern Hardwood Lumber Mfg. Assoc.
805 Steuck Bldg.
Memphis, TN 38103

Stanley Tool Company
P.O. Box 1800
New Britain, CT 06050

State Accident Insurance Fund
Capitol Mall
Center and Summer St. N.E.
Labor and Industries Bldg.
Salem, OR 97058

Sterling Publication Co., Inc.
2 Park Ave.
New York, NY 10016

Stobart & Son, Ltd.
67-73 Worshire St.
London EC2AZEL England

Superintendent of Documents
U.S. Government Printing Office
Library Division
Washington, D.C. 20402

Syracuse U Press
1011 E. Water St.
Syracuse, NY 12310

Tap Plastics
3011 Alvarado St.
San Leandro, CA 94577

The American Plywood Assoc.
P.O. Box 11700
Tacoma, WA 98411-0700

The Furniture Library
Attn: W. I. Biewenstock, Curator
1009 North Main St.
High Point, NC 27262

The National Center for Research
In Vocational Education
Attn: Sarah Williams, Program Assistant
1960 Kenny Rd.
Columbus, OH 43210

The Ohio Knife Co.
2668 N. E. Riverside Way
Portland, OR 97211

The Resources Agency
Attn: Jessie E. Rios
Dept. of Forestry
2524 Mulberry St.
P.O. Box 1067
Riverside, CA 92502

TRADA
Hughenden Valley, High Wycombe
Buckinghamshire HP144NO England

The Ohio Knife Co.
1770 Dreman Ave.
Cincinnati, OH 45223

The Wood Book
Avery-Phares, Inc.
157 Yesler Way, Suite 317
Seattle, WA 98104

3M Company
Educational Service
Box 3100
St. Paul, MN 55101

3M Company
General Offices
3M Center
St. Paul, MN 5514

Trade Technical College
400 W. Washington Blvd.
Los Angeles, CA 90015-4181

U.S. Dept. of Commerce
NBS
Washington, DC 20234

U.S. Dept. of Labor
Bureau of Apprenticeship and Training
840 Federal Building
1220 S.W. Third
Portland, OR 97204

UBC Local 1928
Attn: Pat Hagerty
Vancouver, B.C.
Tel #1-604-525-1091

Unfinished Furniture Industry
1850 Oak St.
Northfield, IL 60093

University of Alabama
University Station
Mobile, AL 36688

University of California
Attn: Jonathan D. Lew, Research Associate
Forest Products Lab
47th and Hoffman Blvd.
Richmond, CA 94804

University of North Carolina
Industrial Extension Service
Box 1125
New Bern, NC 28560

University of Texas Press
Box 7819
Austin, TX 78712

USM Corporation
Construction Products
Shelton, CT 06484

Van Nostrand Reinhold Co.
135 West 50th St.
New York, NY 10020

Vance Publishing Corp.
300 W. Adams
Chicago, IL 60606

Vocational Instructional Services
Vocational Industrial Education
F.E. Box 182
Texas A & M University
College Station, TX 77843

VOCED Magazine
American Vocation Assoc.
2020 N. Fourteenth St.
Arlington, VA 22201

Warren Tool Group
P.O. Box 68
Hiram, OH 88234

Western Wood Product Assoc.
1500 Yeon Bldg.
Portland, OR 97204

Westinghouse Learning Corp.
5005 West 110th St.
Oak Lawn, IL 60453

Wetzler Clamp Co.
43-15 11th St.
Long Island City, NY 11101

William Kaufmann, Inc.
One First Street
Los Altos, CA 94022

WMMA
1900 Arch St.
Philadelphia, PA 19103

Wood Moulding and Millwork Producers, Inc.
P.O. Box 25278
Portland, OR 97225

Woodcraft Supply Corporations
313 Montvale
Woburn, MA 01801

Woodwork Institute of Calif.
1833 Broadway
P.O. Box 11428
Fresno, CA 93773

Woodworking and Furniture Digest
Hitchcock Publishing
Hitchcock Building
Wheaton, IL 60187

Workmens Compensation Board
Salem, OR 97310

Workrite Products Co.
1315 S. Flower St.
Burbank, CA 91502

Yates-American Machine Co.
2880 Kennedy Dr.
P.O. Box 958
Beloit, WI 53511

APPENDIX G

MATERIALS

F
187 (P) **A Guide to the Use of Saws and Cutters**
Timber Research and Development
Association
48p. 1979

Subjects: Machinery

C
95 **A Manual of Veneering**
Paul Villiard
Dover
174p. 1975

Subjects: Materials

F5
133 (P) **Abrasive Wheel Machinery**
Workmen Compensation Board of Oregon
37p. 1974

Subjects: Teaching Safety Machinery

C
254 (P) **Acoustic Performance of Particleboard Floor Systems**
National Particleboard Association
10p.

Subjects: Materials

C8
100 **Adhesive Bonding of Wood**
M. L. Selbo
Drake
119p. 1978

Subjects: Materials

C8
32 **Adhesives and Glues: How to Choose and Use Them**
Robert S. Miller
Franklin Chemical Industries
186p. 1980

Subjects: Materials

IC8
13 **Adhesives in Building Construction**
Forest Products Lab
157p. 1978

Subjects: Materials

C
193 (P) **Application Instructions for Basic Hardboard Products**
American Hardboard Association
6p.

Subjects: Materials

I
54 (P) **Aptitude Test Battery Cabinetmaker**
U.S. Dept. of Labor Manpower
Administration
1970

Contents: Technical evaluation

Subjects: Teaching materials

E7
206 (P) **Architectural Casework Details**
Architectural Woodwork Institute
11p. 1969

Subjects: Planning and business

E
97 **Architecture Design Engineering Drawing**
William P. Spence
McKnight
581 pg. 1979

Subjects: Business and planning

C
33 **Architectural Woodwork Quality Standards**
Architectural Woodwork Institute
105p. 1975

Contents: Guide specifications and quality certification program.

Subjects: Materials, finish carpentry, millwork doors and windows

A7
162 (P) **Aspects of High Frequency Dielectric Curing**
L & L Machinery
6p.

Contents: Theory and application

Subjects: Machinery, power hand tools

C2c
115 (P) **Back Care**
Arthur E. Grant, Murray A. Swanson
Medic Pub. Co.
22p. 1975

Contents: Lifting and exercises for back strain

Subjects: Teaching, safety, materials

C
190 (P) **Basic Hardboard**
American Hardboard Assoc.
4p. 1982

Subjects: Materials

C
155 (P) **Beautiful Woods**
Frank Paxton Lumber Co.
60p. 1978

Subjects: Materials

D
184a-q **Binks Training Materials**
Binks

Contents: Safety spray booths, spray application processes, spray equipment selection

Subjects: Finishing

D
184a-q **Binks Training Materials**
Binks

Contents: Viscosity, finish problem solvents, base coating, compress air spray gun principles hose, compressed air, material supply, operator techniques, hand spray techniques airless, hot spray, plural component spray, electrostatic spray, auto spray equipment

E4
9 **Blueprint Reading for Construction**
Walter C. Brown
Goodheart Willcox
331p. 1980

Subjects: Planning

E4
59 **Blueprint Reading for Commercial Construction**
Charles D. Willis
Delmar
346p. 1979

Subjects: Business and planning

I
12 **Blueprint Reading for Construction**
Walter C. Brown
Goodheart Willcox
31p. 1980

Contents: Instructor guide

Subjects: Teaching materials

E4
44 **Building Trades Blueprint Reading 3 Parts**
Elmer W. Sundberg
American Technical Society
176p., 125p., 139p. 1974

Subjects: Planning

C
258 (P) **Buyer's Guide: Decorative Lumber and**
Veneer - Foreign and Domestic Species
Fine Hardwoods/American Walnut Assoc.
4p. 1983

Subjects: Materials

J
26 **Cabinetmaking and Millwork - Student Guide**
John L. Feirer
Bennett
175p. 1976

Subjects: Power hand tools, hand tools, finishing, millwork doors and windows, machinery, finish carpentry, business and planning, materials, cabinetmaking

I
39 **Cabinetmaking Teacher's Guide**
John L. Feirer
Bennett
27p. 1977

Contents: Teachers guide to cabinetmaking and millwork.

Subjects: Teaching materials

K
128 (P) **Carbon Monoxide**
U.S. Dept. of Labor OSHA 2224
4p. 1975

Subjects: Safety and teaching

K
126 (P) **Carcinogens**
U.S. Dept. of Labor OSHA 2204
17p. 1975

Subjects: Safety and teaching

H
34 **Carpenter**
Dept. of the Army
150p. 1971

Contents: Rough construction

Subjects: Finish carpenter, millwork

H
42 **Carpentry Apprentice Training Course**
United Brotherhood of Carpenters and
Jointer of America
1968

Subjects: Finish carpentry, millwork, planning and safety

H10b
1 **Carpentry, Modern**
Willis H. Wagner
Goodheart Wilson
590p. 1983

Contents: Material, handtools, powertools, finish carpentry, doors and window stairs

Subjects: Finish carpentry, millwork door and windows

B
164 (P) **Chip Chats**
National Wood Carvers Association
2p. 1983
Bi-monthly magazine

Subjects: Hand Tools

B
175 (P) **Clamps**
Adjustable Clamp Company
40p. 1976

Contents: Catalog

Subjects: Handtools

B
177 (P) **Clamps by Wetzler**
Wetzler Clamp Co.
12p. 1983

Contents: Catalog

Subjects: Handtools

B
169 (P) **Clamps-Their History and Their Uses**
Cincinnati Tool of Warren Tool
16p.

Subjects: Hand Tools

C
195 (P) **Coated Abrasives Standard Stock**
Norton Company
58p. 1983

Subjects: Machinery, materials

B
173 (P) **Columbia Clamps**
Warren Tool Group

Contents: Catalog

Subjects: Handtools

K
93 (P) **Construction Industry**
U.S. Dept. of Labor OSHA 2202
44p. 1975

Subjects: Safety, teaching

J
79 **Constructing and Manufacturing Wood Products**
Wayne H. Zook
McKnight
434p. 1973

Subjects: Power hand tools, hand tools, finishing, machinery, millwork doors and windows, materials, business and planning, finish carpentry, cabinetmaking, safety and health machine process.

H10b
104 **Construction Manual: Finish Carpentry**
T. W. Love
Craftsman Book Company
188p. 1974

Subjects: Finish carpentry, millwork doors and windows

J
37 **Construction Safety and Health Regulations**
OSHA U.S. Dept. of Labor
1974

Subjects: Safety and health

I
63 **Contemporary Industrial Teaching**
Ronald J. Baird
Goodheart-Wilcox
200p. 1972

Subjects: Teaching Materials

F
118 (P) **Controls For Industrial Noise**
SAIF
11p.

Subjects: Safety, teaching, Machiner

J
51a-f **Course in Cabinetmaking and Millwork**
3 workbooks and 3 testbooks
Bureau of Industrial Education
California State Dept. of Education
1962-72

Subjects: Power hand tools, hand tools, finishing, machinery, machine processes, millwork door and windows, materials, business and planning, finish carpentry, cabinetmaking, safety and health

I
58 (P) **Course Outline Machine Operation and Joinery**
Honolulu Community College, Hawaii

Subjects: Teaching

I
4 **Curriculum Guide for Building Construction**
Oregon Board of Education
211p. 1972

Contents: Instruction guides and resource material in safety, tools, communication, etc.

I
3 **Curriculum Standards for Cabinetmaking**
State of Alabama
68p. 1982

Contents: Cabinetmaking performance objectives

Subjects: Teaching materials

I
8 **Curriculum Standards for Carpentry**
State of Alabama
67p. 1982

Contents: Carpentry performance objectives

Subjects: Teaching materials

C
212 (P) **Curved Plywood Demand Increases**
Hardwood Plywood Manufacturer Assoc.
6p.

Subjects: Materials

F
50 **Deutsche Holzbearbeitungsmaschinen III**
(German Woodworking Machinery)
VDMA
552p.

Subjects: Machinery

H10a
68 **Designing Staircases**
Willibald Mannes
Van Nostrand Reinhold Company
144p. 1982

Subjects: Cabinetmaking, finish carpentry

B
176 (P) **Diamond Tool Catalog**
Diamond Tool
51p. 1983

Subjects: Hand tools

C
210 (P) **Design Procedure for the Sound Absorption of Resonant Plywood Panels**
Hardwood Plywood Manufacturer Assoc.
13p.

Subjects: Materials

E8
46 **Drafting Made Simple**
Yonny Segel, M.S.
Doubleday
192p. 1962

Subjects: Business and planning

E8
136 **Drafting Technology and Practice**
Dr. William P. Spence
Bennett Publishing
807p. 1980

Contents: Exposure to all drafting I, chapter on cabinetmaking

Subjects: Planning and business

E8
137

Drafting Worksheets for E8 136
William Spence
Bennett Publishing
131p. 1981

Subjects: Planning and business

K
85 (P) **Electrical Safety**
Workmen Compensation Board of Oregon
1974

Subjects: Safety, teaching

F
96 (P) **Essentials of Machine Guarding**
U.S. Dept. of Labor OSHA 2227
20p. 1975

Subjects: Teaching, safety, machinery

C2c
116 (P) **Essentials of Material Handling**
U.S. Dept. of Labor OSHA 2236
23p. 1975

Contents: Heavy materials handling

Subjects: Safety, teaching, materials

J
66 **Exploring Woodworking**
Fred W. Zimmerman
Goodheart-Willcox
208p. 1981

Subjects: Power hand tools, hand tools, finishing, machinery, materials, business, planning, machine process, cabinetmaking

H10b
19 **Exterior and Interior Trim**
John E. Ball
Delmar
192p. 1975

Subjects: Finish carpentry

C
213 (P) **Face Veneer Manufacturers**
Hardwood Plywood Manufacturers Assoc.
4p.

Subjects: Materials

B
153 (P) **Facts On Files**
Simonds - Wallace Murray Corp.
12p.

Subjects: Hand tools

K
78 (P) **Fiberglass Layup and Sprayup**
U.S. Dept. of Health, Education and
Welfare
1976

Subjects: Safety

C
253 (P) **Fine Hardwood Selectorama**
Fine Hardwoods American Walnut Assoc.
57p. 1978

Subjects: Materials

D
159 (P) **Finishes**
Canadian Wood Council
23p. 1981

Contents: Interior and exterior

Subjects: Finishing

D
61 **Finishing Technology**
George A. Soderberg
McKnight and McKnight
308p. 1969

Subjects: Finishing

D
241 (P) **Finishing Wood Furniture**
National Paint and Coatings Association
3p. 1981

Subjects: Finishing

K
130 (P) **First Aid for Foreign Body Obstruction of the Airway**
American National Red Cross
25p. 1975

Subjects: Safety teaching

C
77 **Formulas, Methods, Tips and Data for Home and Workshop**
Kenneth M. Swezey
Harper and Row
670p. 1979

Subjects: Finishing, materials, business and planning

C
217 (P) **From Tree to Trim**
Western Wood Moulding and Millwork Producers
95p. 1975

Subjects: Materials and millwork door and window

J
53 **Four-Year Program of Study for Carpentry Apprentices**
Consultants Committee on Curriculum Development
Dept. of Education of Massachusetts
111p. 1976

Subjects: Cabinetmaking, finish carpentry

J
7 **Furniture and Cabinetmaking**
John L. Feirer
Bennett Publishing Company
512p. 1983

Subjects: Power hand tools, hand tools, materials, finishing, machine processes, cabinetmaking, business and planning

E5
28 **Furniture Construction**
Rudolph Willard
North Carolina State
321p. 1982

Contents: Material, design, production

Subjects: Material planning cabinetmaking

J
216 **Furniture Facts**
Hoover Universal
165p. 1980

Contents: Glossary of terms and styles

Subjects: Cabinetmaking

D
6 **Furniture Finishing Textbook**
Furniture Production Publishing Co.
120p. 1977

Contents:

Subjects: Finishing

I
56 (P) **Furniture Manufacturing and Management**
North Carolina State University
1982

Contents: Course brochure

Subjects: Teaching material

E
31 **Furniture Manufacturing Processes**
Anco L. Prak and Thomas W. Myers
North Carolina State
175p. 1981

Subjects: Planning materials

K
92 (P) **General Industry**
U.S. Dept. of Labor OSHA 2201

Subjects: Safety teaching

J
38 **General Industry Safety and Health Regulation**
OSHA U.S. Dept. of Labor
250p. 1974

Subjects: Safety and health

J
64 **General Woodworking**
Chris H. Groneman
McGraw-Hill
324p. 1982

Subjects: Power hand tools, hand tools, machinery, machine process, finishing, materials, business and planning, cabinetmaking

F59
141 **Getting the Most Out of Your Abrasive Tools**
Rockwell International
122p. 1979

Contents: Belt and orbital hand sanders, edge sanders and bench grinder and sharpening.

Subjects: Power hand tools, hand tools, machinery, materials

G6
140 **Getting the Most Out of Your Band Saw**
Rockwell International
121p. 1978

Subjects: Machinery, machine processes

G9
139 **Getting the Most Out of Your Drill Press**
Rockwell International
121p. 1978

Contents: Include jigs, fixtures, sanding, drill sharpening

Subjects: Machinery, machine processes, hand tools

G345
138 **Getting the Most Out of Your Table Saw**
Rockwell International
121p. 1978

Subjects: Machinery, machine process

C
248 (P) **Gluing Guide**
National Casein
5p.

Subjects: Materials

C
231 (P) **Grading Description Hardwoods**
National Hardwood Lumber Association
5p.

Subjects: Materials

F
251 (P) **Grinders and Safety Requirements**
Workmens Compensation Board of Oregon
1p.

Subjects: Machinery and safety

C
205 (P) **Guide to Wood Species**
Architectural Woodwork Institute
26p. 1977

Contents: Good color plates

Subjects: Materials

C
157 (P) **Guidelines for Grinding**
3M Company
12p.

Contents: Metal finishing

Subjects: Materials

H10b
95 **Handbook of Carpentry and Joinery**
A. B. Emary
Sterling
325p. 1981

Subjects: Finish carpentry, millwork doors and windows

H3
98 **Handbook of Doormaking, Windowmaking, and Staircasing**
Antony Talbot
Sterling
253p. 1980

Subjects: finish carpentry, millwork doors and windows

F
238 (P) **Handling Storage and Inspection of Grinding Wheels**
A-P Wherry and Associates
15p. 1979

Subjects: Machinery safety

B
40 **Hand Tool Handbook for Woodworking**
R. J. DeCristoforo
H. P. Books
184p. 1977

Subject: Hand tools, materials

A
99 (P) **Hand Tools and Hand Held Power Driven Tools Safety Code**
Workmens Compensation Board of Oregon
15p. 1974

Subjects: Teaching, safety, power hand tools

B
2 **Hand Woodworking Tools**
Leo P. McDonnell, Alson Kaumeheiwa
Delmar
273p. 1978

Contents: Hand tools, fasteners, abrasives

Subjects: Hand tools, materials

C
156 (P) **Hardwood and Decorative Plywood NBS**
Voluntary Product Standard
U.S. Dept. of Commerce N.B.S.
16p. 1972

Subjects: Materials

C
211 (P) **Hardwood Plywoods Role in KD Furniture**
Hardwood Plywood Manufacturers Assoc.
1p.

Subjects: Materials

C
199 **Hardwood Plywood Sales Manual**
Hardwood Plywood Manufacturers Assoc.
19p

Subjects: Materials

K
112 (P) **Health and Safety Guide for Retail Lumber and Building Materials**
U.S. Dept. of Health, Education and
Welfare NIOSH 75-146
88p. 1975

Subjects: Safety teaching

K
119 (P) **Health and Safety Guide for the Manufacturers of Paints and Allied Products**
U.S. Dept. of Health, Education and
Welfare NIOSH
76p. 1975

Content: Good lifting and fire extinguishing diagram

Subjects: Safety and teaching

K
94 (P) **Health and Safety Guide for Wooden Furniture Manufacturing**
U.S. Dept. of Health, Education,
Welfare NIOSH 75-167
86p. 1975

Subjects: Teaching, safety

B
151 (P) **Here's How**
Appalachian Hardwood Manufacturers, Inc.
9p.

Contents: Simple projects

Subjects: Hand tools

C
204 (P) **High Pressure Laminates as an Architectural "Woodwork" Material**
Architectural Woodwork Institute
25p. 1981

Subject: Materials, cabinetmaking

F
168 (P) **High Quality Woodworking Machinery**
Yates-American
2p.

Subjects: Machinery

H
219 (P) **How to Install Interior Jambs and Exterior Door Frames**
Wood Moulding and Millwork Producers

Subjects: Millwork, doors and windows

H
221 (P) **How to Work with Wood Mouldings**
Wood Moulding and Millwork Producers
2p. 1981

Subjects: Millwork, doors and windows

C
182 **Imported Wood Purchasing Guide - Tenth Edition**
MacBeath Hardwood Company
International Wood Trade Publications
400p. 1982

Subjects: Materials

J
183 **Index to Periodicals**
Forest Products Research Society
44p. 1983

Subjects: Cabinetmaking, hand tools, power hand tools, machinery, machine process, millwork, finishing, planning and business

A
65 **Individualized Learning Systems**
Oregon Board of Education
1973

Contents: Drill, power plane, router, saber saw, orbital sander, belt sander, circle saw

Subjects: Power hand tools

B
67 **Individualized Learning Systems**
Oregon Board of Education
1973

Contents: Square, planes, nail set, hand saw, tape measure, level chisel, drill

Subjects: Hand tools

F
69 **Individualized Learning System**
Oregon Board of Education
1973

Contents: Machinery

Subjects: Machinery

K
122 (P) **Industrial Exposure to Ozone**
U.S. Dept. of Health, Education,
Welfare NIOSH
2p. 1973

Subjects: Teaching safety

C
196 (P) **Industrial Sharpening Stones**
Worton
11p. 1982

Subjects: Materials, hand tools

F
101 **Information Sources on Woodworking Machinery UNIDO**
United Nations Publication
99p. 1978

Subjects: Machinery

C
229 **Inspection Training Manual: Hardwoods**
National Hardwood Lumber Association
184p. 1974

Subjects: Materials

H10b
71 **Interior Finish: More Tricks of the Trade**
Bob Byvanen
East Woods Press
126p. 1982

Subjects: Finish carpentry

E
70 **Introduction to Applied Physics**
Marcus and Thrower
Breton Publishers
594p. 1980

Subjects: Machinery, business and planning

C
237 (P) **Introduction to Grading and Measurement of Hardwood Lumber**
National Hardwood Lumber Association
19p.

Subjects: Materials

A5
35 **Instruction Manual for Ammo Model KS Low Velocity Powder Actuated Tool (P)**
U.S.M. Corporation
12p. 1971

Subjects: Power hand tools

G
166 (P) **Joints and Their Uses**
Yates-American Machine Company
23p.

Subjects: Machine processes

G
178 (P) **Knife Marks on Wood**
Ex-Cell-O Corp.
4p. 1951

Subjects: Machinery, machine process

K
132 (P) **Ladder Types Uses Care**
Workmens Compensation Board of Oregon
25p.

Subjects: Safety and teaching

K
110 (P) **Laser Safety**
Workmens Compensation Board of Oregon
14p. 1973

Subjects: Safety, teaching

K
127 (P) **Lead**
U.S. Dept. of Labor OSHA 2230
4p. 1975

Subjects: Safety teaching

C
161 (P) **Lessons in Appalachian Forestry**
Appalachian Hardwoods Manufacturers
Association
24p.

Subjects: Materials

K
87 (P) **Lifting**
State Accident Insurance Fund
1977

Subjects: Safety, teaching

F
49 **Ligna Hannover '83**
V.D.M.A.
300p. 1983

Subjects: Machinery

F
48 **Machine Woodworking, Modern**
William F. Holtrop, Herman Hjorth
Bruce
279p. 1960

Subjects: Planning, machinery

F
134 **Machinery and Machine Guarding**
Workmens Compensation Board of Oregon
79p. 1974

Subjects: Safety, teaching, machinery

C
227 (P) **Macroscopic Structure of Hardwoods**
Timber Research and Development
Association
224p. 1960

Subjects: Materials

F
194 (P) **Maintaining Efficient Wide Belt Sanding and Grinding Operations**
Norton Company
Norton International
20p. 1978

Subjects: Machinery

H
263 **Manual of Millwork: Standards of the Woodwork Industry**
Woodwork Institute of California
150p. 1978

Subjects: Millwork, doors and windows

C
113 **Manufacturing Process: Woods**
Gerald D. Cheek
Prentice-Hall
122p. 1976

Subjects: Finishing, machine process, materials

C
259 (P) **Mat-Formed Wood Particleboard**
National Particleboard Association
5p. 1979

Subjects: Materials

E
103 **Mathematics for Carpenters**
Robert Bradford
Delmar
321p. 1975

Subjects: Business and planning

C
260 (P) **Medium Density Fiberboard for Interior Use**
National Particleboard Association
4p. 1980

Subjects: Materials

K
129 (P) **Mercury**
U.S. Dept. of Labor OSHA 2238
4p. 1975

Subjects: Safety teaching

C
158 (P) **Metal Working**
3M Co.
24p.

Contents: Metal finishing

Subjects: Materials

A
214 (P) **Milwaukee Electric Tools Catalog**
Milwaukee Electric Tool
106p. 1984

Subjects: Power hand tools

A
215 **Milwaukee Training Manual**
Milwaukee Electric Tool Co.
237p. 1980

Subjects: Power hand tools

B
181 (P) **Milwaukie Tool Catalog #482**
Milwaukie Tool and Equipment Co.
15p.

Subjects: Hand tools

J
52A-D **Millwork and Cabinetmaking Apprentice Related Training - 4 Parts**
Voc. Ed. Coordinating Council for Occupational Education, Washington State 1971

Contents: Theory, tests

Subjects: Teaching material, planning and business, cabinetmaking, safety and health

B
174 (P) **Mitering and Veneering**
Adjustable Clamp Co.
4p.

Contents: Clamp jigs

Subject: Hand tools

F
209 (P) **Mold, Profile and Contour Wood Sanding**
Norton
23p. 1978

Subjects: Machinery

K
75A-D **Multimedia Standard First Aid Course 4 Work Books**
American National Red Cross

Subjects: Teaching and health safety

C
261 (P) **Newsletter**
Wood Unlimited
4p. 1983

Subjects: Materials

F
223 (P) **Nicholson Bandsaw Blade Guide**
Cooper Tool Group
24p. 1983

Subjects: Machinery machine process

B
226 (P) **Nicholson Guide to Files and Filing**
Cooper Tool Group
26p. 1979

Subjects: Hand tools

B
222 (P) **Nicholson Saw Guide**
The Cooper Group
25p. 1983

Subjects: Hand tools

H
225 (P) **1983 Directory of Members, Products and Services**
Wood Moulding and Millwork Producers Association
44p. 1983

Subjects: Millwork, doors and windows

F
185 (P **Noise and Woodworking Machinery**
Timber Yard Operating Manual
Timber Research and Development Assoc.
34p. 1975

Subjects: Machinery, safety and health

F
142a-e **Operator Training Manuals**
North Carolina State University
1970

Contents: Introduction manual for training additional operators. Not much equipment explanation for router edge sander, variety saw, band saw, hand shaper

Subjects: Machinery, machine process, business and planning

F
143a-k **Operator Training Manuals**

Contents: Auto double belt feed through sander multi-drum sander

Subjects: Machinery, machine process, business planning, teaching, millwork

F
143a-k **Operator Training Manuals**
North Carolina State University
1970

Contents: Manual for training additional operators. Not much equipment explanation. Continuous edge gluer, glue reel, profile shaper, auto rev. table shaper, chain driven auto shaper, moulder, tapeless splicer, veneer equipment, wide belt sander,

F
144a-o **Operator Training Manuals**

Contents Cont: Single end trim and boring machine, multiple spindle hollow chisel mortiser, horizontal and vertical multiple spindle boring machines, dovetailer, single and double end tennoner

Subjects: Planning, machinery, machining processes, teaching millwork

F144a-o **Operator Training Manuals**
North Carolina State University
1970

Contents: Manuals for training additional operators. Not much equipment explanation for cut off saw, facer, double surface planer, abrasive planer, straight line rip saw, single surface planer, double end trim saw, double end miter saw

K
249 **Oregon Safety Code for Places of Employment: Ladders and Scaffolds**
Workmens Compensation Board of Oregon
100p. 1974

Subjects: Safety and health

K
81 **OSHA Your Workplace Rights in Action**
U.S. Dept. of Labor OSHA 3032
1978

Contents: Legal recourse

Subjects: Safety, teaching

I
55 (P) **Outline Apprentice Program**
Milwaukee, Wisconsin
1972

Subjects: Teaching materials

D
245 (P) **Painting Particleboard**
National Paint and Coating Association
3p.

Subjects: Finishing

D
242 (P) **Paint Tricks Techniques and Treatments**
National Paint and Coatings Assoc.
11p. 1981

Subjects: Finishing

C
189 (P) **Panel Handbook and Grade Glossary**
American Plywood Association
42p. 1983

Subjects: Material

C
257 (P) **Particleboard Shelf System**
National Particleboard Association
2p.

Subjects: Materials

K
102 (P) **Places of Employment Safety Code**
Workmens Compensation Board of Oregon
14p. 1976

Subjects: Teaching safety

F
186 (P) **Planer Moulders: Their Performance and Productivity**
Timber Research and Development Assoc.
36p. 1978

Subjects: Machinery

F
90 **Power Tool Maintenance**
Daniel W. Irvin
McGraw-Hill
291p. 1971

Subjects: Machinery

IE2
20 **Practical Problems in Mathematics for Carpenters**
Harry C. Huth
Delmar
217p. 1979

Subjects: Business and planning

C
191 (P) **Prefinished Hardboard Paneling**
American Hardboard Association
6p. 1982

Subjects: Materials

D
243 (P) **Preventing Moisture Damage**
National Paint and Coatings Association
5p. 1981

Subjects: Finishing

F5a
80 (P) **Primer on Grinding Wheel Safety**
Norton Abrasives Marketing Group
25p. 1972

Subjects: Safety, teaching, machinery

J
45 **Principles of Woodworking**
William F. Holtrop and Herman Hjorth
Bruce
595p. 1961

Subjects: Hand tools, machinery, finishing, cabinetmaking

F
27 **Production Woodworking Equipment**
Rudolph Willard
North Carolina State University
300p. 1980

Subjects: Machinery and millwork

B
180 (P) **Professional Hand Saw Guide**
Disston
6p. 1980

Subjects: Hand tools

D
246 (P) **Proper Care of Furniture Finishes**
National Paint and Coatings Association
3p.

Subjects: Finishing

C
150 (P) **Proper Storage of Lumber**
Southern Forest Products Association
1p.

Subjects: Materials

H3
111 **Purpose-Made Joinery**
E. V. Foad
Van Nostrand Reinhold
204p. 1982

Subjects: Finish carpentry, millwork doors and windows, business and planning, machinery

H
218 (P) **Quality Standards**
Wood Moulding and Millwork Producers
8p. 1979

Contents: Hinged door jambs, door frames, moulding

Subjects: Millwork, doors and windows

K
131 (P) **Questions and Answers to Part 1910**
U.S. Dept. of Labor OSHA 2095
30p. 1974

Subjects: Safety and teaching

E6
43 **Rapid Viz-A New Method for the Rapid Vizualization of Ideas**
Hanks and Belliston
William Kaufman, Inc.
149p. 1980

Subjects: Business and planning

E5
240 (P) **Recommended Construction and Performance Standards for Kitchen and Vanity Cabinets**
National Kitchen Cabinet Association
8p. 1980

Subjects: Planning and business

C
163 (P) **Rules for Hardwood Dimension Parts**
Hardwood Dimension and Manufacturers Association
27p. 1976

Subjects: Materials

C
230 (P) **Rules for the Measurement and Inspection of Hardwood and Cypress**
National Hardwood Lumber Association
115p. 1982

Subjects: Materials

K
82 (P) **Safety Code for Ladder and Scaffolds**
Workmens Compensation Board of Oregon
1961

Subjects: Safety and teaching

F
247 (P) **Safety Guide for Grinding Wheel Users**
A & P Wherry Association, Inc.
1p.

Subjects: Safety, machinery, materials

F
244 (P) **Safety Recommendation for Abrasive Wheel Operation**
A & P Wherry Association, Inc.
26p. 1979

Subjects: Machinery, materials, safety

F
250 (P) **Safety Requirements for Abrasive Wheel**
A & P Wherry Association, Inc.
105p. 1978

Subjects: Machinery, Safety, materials

K
107 (P) **SBA Loans for OSHA Compliance**
U.S. Dept. of Labor OSHA 2005
4p. 1975

Subjects: Business teaching, safety

F
36 **Selecting and Using Electric Motors (P)**
U.S. Department of Agriculture
56p. 1974

Subjects: Machinery

C
167 **Short Talks on Wood**
Yates-American Machine Company

Subjects: Materials

H10a
24 **Simplified Stair Layout**
J. Douglas Wilson
Delmar
64p. 1973

Subjects: Finish carpentry

C
149 (P) **Southern Pine Provides Delightful Decor Along With Structural Strength**
Southern Forest Product Association
4p.

Contents: Visual

Subjects: Materials

C
147 (P) **Southern Pine Use Guide**
Southern Forest Products Association
28p.

Subject: Materials

C
192 (P) **Span Tables for Joists and Rafters**
National Forest Products Association
43p. 1977

Subject: Materials

F
239 (P) **Special Speeds for Grinding Wheels**
A & P Wherry & Associates, Inc.
19p. 1979

Subjects: Materials, machinery, safety

C
200 (P) **Specifying Hardwood Plywood for Architecural Uses**
Hardwood Playood Manufacturers Assoc.
4p.

Subjects: Materials

H10a
74 **Stair Layout**
Stanley Badzinski, Jr.
American Technical Publishers
72p. 1971

Subjects: Finish carpentry, cabinetmaking, business and planning

C7c
135 (P) **Storing and Handling Materials and Material Handling Equipment**
Workmens Compensation Board of Oregon
31p. 1978

Subjects: Safety materials teaching

C
256 **Technical Bulletin**
National Particleboard Association
1974

Contents: Sanding, handling and storage, filling, joints used with, edgebanding and veneering, sawing, edge filling, shelving design, screw holding, themal conductivity (of particleboard)

Subjects: Materials

J
91 **Technical Woodworking**
Chris H. Groneman and Everett R. Glazener
McGraw Hill
434p. 1976

Subjects: Power hand tools, hand tools, machinery, machine process, millwork doors and windows, materials, finish carpentry, cabinetmaking, business and planning

J
41 **The Complete Book of Woodworking and Cabinetmaking**
Byron W. Maguire
Reston Publishing Co.
403p. 1977

Subjects: Machining process, business and planning, materials, cabinetmaking

D
73 **The Complete Manual of Wood Finishing**
Frederick Oughton
Stein and Day
288p. 1983

Subjects: Finishing

K
89 (P) **The Employee and OSHA**
U.S. Dept. of Labor OSHA 2099
5p. 1978

Subjects: Safety and teaching

C
148 (P) **The Engineered 24" Framing System**
Southern Forest Products Association
14p.

Subjects: Materials

F
207 **The Grinding Wheel**
Kenneth B. Lewis, William F. Schleigher
A & P Wherry and Associates, Inc.
459p.

Subjects: Machinery

B
108 **The History of Woodworking Tools**
W. L. Goodman
Redwood Press Limited
208p. 1972

Subjects: Hand tools

J
83 **The Impractical Cabinetmaker**
James Krenov
VanNostrand Reinhold Company
160p. 1979

Subjects: Materials, business and planning, cabinetmaking

J
88 **The Pegasus Book of Woodworking**
Frank Jackson
Dennis Dobson
184p. 1966

Subjects: Cabinetmaking

C
255 (P) **The Sound and Use of Particleboard and MDF In TV-Stereo-Speaker Markets**
National Particleboard Association
10p.

Subjects: Materials

C
154 (P) **The Southern Hardwoods**
Southern Hardwood Lumber Manufacturer
Association
67p.

Contents: Tree and lumber description

Subjects: Materials

Blc
76 **The Steel Square**
H. H. Siegele
Sterling
192p. 1982

Subjects: Hand tools

A
22 **The Use of Portable Power Tools**
Leo P. McDonnell and Alson I. Kaumeheiwa
Delmar
218p. 1980

Subjects: Power hand tools

C
5 **The Wood Book**
Avery-Phares, Inc.
1982

Contents: Wood material resources

Subjects: Material

C
16 **The Woodworker's Reference Guide and Sourcebook**
Charles Scribner's Sons
353p. 1983

Subjects: Materials, teaching materials

C
232 **Timbers of the World: Africa**
Timber Research and Development Assoc.
144p. 1978

Subjects: Materials

C
236 **Timbers of the World: Central America and the Caribbean**
Timber Research and Development Assoc.
86p. 1979

Subjects: Materials

C
233 **Timbers of the World: South America**
Timber Research and Development Assoc.
121p. 1978

Subjects: Materials

C
235 **Timbers of the World: South East Asia**
Timber Research and Development Assoc.
82p. 1978

Subjects: Materials

C
234 **Timbers of the World: Southern Asia**
Timber Research and Development Assoc.
99p. 1978

Subjects: Materials

C
201 (P) **Tips on Specifying Architectural Quality - Hardwood Plywood Paneling**
Selbert H. Keiffer
Hardwood Plywood Manufacturers Assoc.
5p.

Subjects: Materials

K
124 (P) **Toluene Disocyanate (TD1)**
U.S. Dept. of Labor OSHA 2248
4p. 1975

Subjects: Teaching, safety, finishing

I
60 (P) **Training Plan for Cabinetmaking**
Ohio State Bureau of Labor

Subjects: Teaching

C
146 (P) **Treat Yourself to Properly Treated Wood**
Southern Forest Products Assoc.
2p.

Contents: Exterior wood tratment

Subjects: Materials

K
123 (P) **Ultraviolet Radiation and the Work Environment**
U.S. Dept. of Health, Education and Welfare NIOSH
2p. 1973

Subjects: Safety, teaching

E4
29 **Understanding Construction Drawings**
Mark W. Huth
Delmar
309p. 1983

Subjects: Business and planning

E4
30 **Understanding Construction Drawings-Prints**
Mark W. Huth
Delmar
Practical prints 1983

Contents: Blueprints to: Duplex, lake house, hidden valley

Subjects: Business and planning

C
84 **Understanding Wood**
R. Bruce Hoadley
Tauton Press
256p. 1980

Subjects: Materials, machine process, finishing

C
197 (P) **USA Wood for the World, Today and Tomorrow**
National Forest Products Association and
USDA Foreign Agricultural Service
24p.

Subjects: Materials

B
252 (P) **Using Hand Tools and Portable Power Tools Safely**
National Safety Council
30p. 1982

Subjects: Hand tools, power hand tools, safety and health

C
202 (P) **Veneer**
Sebert H. Keiffer
Hardwood Plywood Manufacturer Assoc.
4p.

Subjects: Materials

K
125 (P) **Vinyl Chloride**
U.S. Dept. of Labor OSHA 2225
4p. 1975

Subjects: Safety, teaching

K
117 (P) **Welding Safety**
U.S. Dept. of Health, Education and
Welfare NIOSH 75-109
2p. 1974

Subjects: Safety, teaching

A7
165 (P) **Welding With Wood**
Workrite Products Company
30p.

Subjects: Power hand tools

C
203 (P) **Where to Buy Hardwood Plywood and Veneer**
Hardwood Plywood Manufacturers Assoc.
40p. 1983

Subjects: Materials

F
208 (P) **Wide Belt Sanding Today**
Norton
22p. 1978

Subjects: Machinery

C
72 **Wood as an Industrial Arts Material**
Wayne K. Murphy and Richard N. Jorgensen
Pergamon Press
164p. 1974

Subjects: Materials, finishing

C
188 (P) **Wood-Decorative and Practical**
Timber Research and Development Assoc.
6p. 1981

Subjects: Materials

D
107 **Wood Finishing**
F. N. Vanderwalker
Sterling
387p. 1983

Subjects: Finishing

C
14 **Wood Handbook: Wood as an Engineering Material**
Forest Products Laboratory
424p. 1974

Subjects: Materials, finishing

C
86 **Wood Laminating**
J. Hugh Capron
McKnight and McKnight
94p. 1963

Subjects: Materials

C
262 (P) **Woodlot Management**
Mollie Beattie
Country Journal
5p. 1981

Subjects: Materials

H
220 (P) **Wood Moulding Literature for Sales Promotion, Reference and Training**
Wood Moulding and Millwork Producers Association
1p. 1983

Subjects: Millwork doors and windows

H
224 (P) **Wood Moulding Patterns**
Western Wood Moulding and Millwork Producers
16p. 1977

Subjects: Millwork doors and windows

C3-6
145 **Wood Structure and Identification**
H. A. Core, W. A. Cote and A. C. Day
Syracuse University Press
182p. 1979

C
198 (P) **Wood Veneer-Its Manufacture, Installation and How It Should Be Specified**
Arnie Thomsson
Hardwood Plywood Manufacturers Assoc.
10p.

Subjects: Materials

F
172 (P) **Woodworking Industry**
Ohio Knife Co.
6p.

Contents: Catalog

Subjects: Machinery

F
171 (P) **Woodworking Machinery**
Oliver Machinery Co.
15p.

Contents: Catalog

Subjects: Machinery

J
15 **Woodworking, Modern**
Willis H. Wagner
Goodheart and Willcox
431p. 1980

Subjects: Finishing, power hand tools, hand tools, planing machinery, materials, finish carpentry

J
17 **Woodworking, Modern**
Willis H. Wagner
Goodheart and Willcox
128p. 1980

Contents: Workbook

Subjects: Finish, power hand tools, hand tools, planing machinery, materials, finish carpentry

J
18 **Woodworking, Modern**
Willis H. Wagner
Goodheart and Willcox
15p. 1980

Contents: Instructor guide and key

Subjects: Teaching materials

C
228 (P) **Woodworking Reference Manual Abrasives**
3M
32p.

Subjects: Materials and finishing, machinery

G
179 (P) **Woodworking Planer Practice**
John E. Hyler
Ex-Cell-O Corp.
24p.

Subjects: Machine process, machinery

J
114 **Woodworking Principles and Practices**
Roger W. Cliffe
American Technical Publishers
486p. 1981

Subjects: Power hand tools, hand tools, machinery, machine process, finishing, business and planning, materials, cabinetmaking

J
47 **Woodworking Technology**
James J. Hammond, Edward J. Donnelly, et.al.
McKnight and McKnight
457p. 1972

Subjects: Power hand tools, hand tools, finishing, machinery, machine processes, materials, business and planning, cabinetmaking

J
106 **Woodwork Visualized**
Ross C. Cramlet
Collier Macmillan
179p. 1974

Subjects: Cabinetmaking, hand tools, materials

K
105 (P) **Workers Rights Under OSHA**
U.S. Dept. of Labor OSHA 2253
12p. 1975

Subjects: Teaching, safety

C
152 (P) **Working With Acrylite Acrylic Sheet**
CYRO Industries
25p.

Contents: Plexiglass

Subjects: Materials

E8
121 (P) **Working With Ammonia**
U.S. Dept. of Health, Education,
Welfare NIOSH 73-11003
2p. 1973

Subjects: Safety, teaching, planning, materials

C
120 (P) **Working With Industrial Solvents**
U.S. Dept. of Health, Education, Welfare NIOSH
2p. 1974

Subjects: Safety and teaching

A7
170 (P) **Workrite Electronic Welders**
Workrite Products
4p.

Subjects: Power hand tools

C
160 (P) **Your Wood Fact Book**
Appalachian Hardwoods Manufacturers Association
14p.

Subjects: Materials